Distribution and Abundance of Larval Sablefish *(Anoplopoma fimbria)* off the West Coast of Vancouver Island, April 2-18, and May 10-18, 1986

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DISTRIBUTION AND ABUNDANCE OF LARVAL SABLEFISH (Anoplopoma fimbria) OFF THE WEST COAST OF VANCOUVER ISLAND, APRIL 2-18, AND MAY 10-18, 1986

by

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ABSTRACT

Shaw, W., G. A. McFarlane, and D. Davenport. 1988. Distribution and abundance of larval sablefish (Anoplopoma fimbria) off the west coast of Vancouver Island, April 2-18, and May 10-18, 1986. Can. MS Rep. Fish. Aquat. Sci. 1970: 130 p.

The surface distribution and abundance of larval sablefish using a neuston net off Vancouver Island was examined from April 2 to 18 and May 10 to 18, 1986. A total of 74 stations was fished at night with a neuston net during April and 42 stations during May. Nine stations in April and 18 in May were repeated during daylight hours. Sablefish larvae were caught at 31 stations in April for a total of 251 larvae. In May, sablefish were caught at 24 stations for a total 299 larvae. They composed 2.8% and 4.3% of the total coastwide catch of larvae in the night tows during April and May respectively. Estimates of relative abundance for sablefish larvae are presented. The highest relative abundance estimates of sablefish larvae in April were off Wickaninnish Bay, and in May off Clayoquot Sound. Sablefish larvae ranged in length from 7 to 29 mm in April and from 10 to 35 mm in May. The mean length of the larvae in April was 12.7 mm (SE=0.81) and in May, 19.4 mm (SE=1.03).

Bongo tows and vertical plankton hauls were also conducted during both surveys. One sablefish larva was caught in a bongo tow at a midwater depth between 200 m and 500 m.

Other larval species caught during both surveys are also discussed in this report. A summary of the physical oceanographic data collected in both surveys is presented.

Key words: Sablefish larvae, distribution, abundance, neuston net, bongo tows, vertical hauls, Vancouver Island

RÉSUMÉ

Shaw, W., G. A. McFarlane, and D. Davenport. 1988. Distribution and abundance of larval sablefish (Anoplopoma fimbria) off the west coast of Vancouver Island, April 2-18, and May 10-18, 1986. Can. MS Rep. Fish. Aquat. Sci. 1970: 130 p.

Du 2 au 18 avril et du 10 au 18 mai 1986, on a étudié au large de l'île Vancouver distribution l'abondance en surface et de larves de morue charbonnière l'aide d' un filet à neuston. Au total, on a pêché la nuit avec un filet à neuston à 74 stations en avril et à 42 stations en mai. On a répété l'opération pendant la journée à 9 stations en avril et à 18 stations en mai. On a capturé des larves de morue charbonnière à 31 stations en avril pour un total de 251 larves. En mai, on a capturé au total 299 larves à 24 stations. Ces chiffres représentaient 2,8 et 4,3 % des prises totales de larves sur tout la côte capturées lors de traits de nuit réalisés en avril et mai respectivement. On présente des estimations de l'abondance relative des larves de morue charbonnière. Les estimations les plus élevées de l'abondance relative des larves de morue charbonnière ont été enregistrées en avril au large de la baie Wickaninnish et en mai au large de la baie Clayoquot. La longueur des larves de morue charbonnière variait de 7 à 29 mm en avril et de 10 à 35 mm en mai. La longueur moyenne des larves en avril a été de 12,7 mm (ET=0,81) et en mai de 19,4 mm (ET=1,03).

On a effectué au cours de ces deux relevés des traits de filet Bongo et des coups à la verticale de filet à plancton. On a capturé une larve de morue charbonnière lors d'un trait de filet Bongo entre 200 et 500 mètres.

On parle également dans ce rapport de larves d'autres espèces qui ont été capturées au cours de ces deux relevés. On présente un résumé des données d'océanographie physique qui ont été recueillies lors de ces deux relevés.

Mots-clés: larves de morue charbonnière, distribution, abondance, filet à neuston, traits de filet Bongo, coups de filet à la verticale, île Vancouver.

INTRODUCTION

Two larval surveys were conducted off the west coast of Vancouver Island from April 2-18 and May 10-18, 1986. These surveys are part of a multidisciplinary study in the La Pérouse Bank region. This year's survey results will provide additional information about the annual distribution and relative abundance of sablefish larvae (Anoplopoma fimbria) occupying the surface waters off Vancouver Island. The results of the survey will be used towards developing a sablefish recruitment index. To examine the distribution of sablefish larvae with depth, samples were also collected at stratified depths in the midwater to 700 m. This report is the third in a series with the results of the 1984 and 1985 surveys (Shaw et al. 1985, 1987) already documented.

The results of the surface neuston sampling, bongo sampling and vertical haul sampling are presented. Preliminary information on distribution and relative abundance of other species is also presented.

MATERIALS AND METHODS

FIELD PROCEDURES

Neuston Sampling

Sampling stations for the April survey were located on eight tracklines positioned normal to the coastline extending from Pachena Point to Quatsino Sound. The positions of the stations on the Pachena Point, Barkley Sound, Wickaninnish Bay, Clayoquot Sound, Nootka Sound and Kyuquot Sound tracklines were identical to those presented for the same tracklines described in the 1985 survey (Shaw et al. 1987). The station positions on the Quatsino Sound trackline were identical to those occupied in the 1984 survey (Shaw et al. 1985). For this year's survey, additional stations were positioned on a new trackline extending off Brooks Peninsula. Two additional stations were positioned inside both Quatsino Sound and Kyuquot Sound and one was positioned inside Nootka Sound. The tracklines ranged from 27 to 67 km apart and stations on a trackline ranged from 2 to 38 km apart. Stations on tracklines extended 4 to 190 km offshore and covered a north-south distance of 228 km.

During the May survey, stations were occupied on four tracklines (Pachena Point, Barkley Sound, Wickaninnish Bay and Clayoquot Sound). The positions of those stations were identical to those occupied in the April survey.

The neuston sampler and sampling strategy at sea was the same as described in previous surveys by Shaw et al. (1985) and (1987). In brief, the neuston sampler, a modification of the Sameoto samplers (Sameoto and Jarosynski 1969), is fully described by Mason and Phillips (1986). A flow meter (General Oceanics Model 2030R) was installed in the mouth of the frame. A high speed rotor was used on the flow meter, thus replacing the low speed rotor used in the previous surveys. Each surface tow was 15 minutes long at a speed of 3 knots. All stations were fished at night. Usually 2 tows were conducted upon arrival at a station with some stations being reoccupied at night later in the survey. To investigate differences in the night-day abundance and distribution of sablefish larvae in the surface waters, selected stations were reoccupied during daylight. At the end of each neuston tow the recovered net was thoroughly washed down with a deck hose and the catch was fixed in a 5 percent seawater-formalin solution.

Bongo Sampling

During April, oblique 0.25 m^2 bongo net tows were made at selected stations corresponding to the surface neuston station positions along the Pachena Point, Barkley Sound and Nootka Sound tracklines, and at 2 stations inside Kyuquot Sound. The bongos were equipped with 230 µm and 350 µm black mesh Nitex nets of modified SCOR design and centre-mounted flow meters (General Oceanics Model 2030R) with low speed rotors. All sampling gear was coloured black to minimize potential avoidance and resulting catch bias (Fulton et al. 1982). Tows were made to within 20 m of the sea floor at shallow (<200 m) water stations. Three depth strata were selected for tows at deeper stations (0-200 m, 200-500 m and 500-700 m). Vessel speed was 2-3 knots when towing the bongo. The rate of descent for fishing the bongo nets from the minimum to the maximum depth in any strata was 0.3 m/sec and retrieval speed after reaching the maximum depth was 0.7-0.9 m/sec. Contamination of the samples collected from the 200-500 m or the 500-700 m depth strata to the surface was minimized by using the retrieval speed of 0.7-0.9 m/sec upon setting to the minimum depth of the strata and again upon retrieval after reaching the maximum depth of the strata.

In May, oblique 0.25 m^2 bongo tows were made at selected stations corresponding to the surface neuston station positions along the Pachena Point, Barkley Sound, Wickaninnish Bay and Clayoquot Sound tracklines. The sampling equipment and procedures used and depth strata occupied during May were the same as outlined for the April survey.

The nets recovered at the end of each bongo tow, during both surveys, were thoroughly washed down with a deck hose and the catch preserved in a 5 percent seawater-formalin solution. All stations were occupied during the day.

Vertical Haul Sampling

During April, paired vertical plankton hauls were made at stations on and in the vicinity of the Pachena Point and Barkley Sound tracklines. The positions of the stations on the tracklines were identical to those presented in the 1985 survey (Shaw et al. 1987). The net used was a modified bongo

sampler equipped with two-230 µm black mesh Nitex nets of modified SCOR design. Vertical hauls were made from 200 m (or 10 m from the sea floor at shallow water stations) to the surface. Additional hauls from 700 m to the surface were made at deeper water stations.

In May, a paired vertical plankton haul was made at one station (<200-0 m depth strata) on the Barkley Sound trackline. The position of the station was the same as the one occupied in the April survey. The net used in the May survey was the same one used in April.

After each vertical haul the recovered nets were thoroughly washed down with a deck hose and the catch from one of the paired samples was preserved in a 5 percent seawater formalin solution while the catch from the other half was frozen in plastic bags.

Oceanographic Sampling

Physical oceanographic data were collected at selected stations on all tracklines during each cruise. All oceanographic stations occupied on tracklines corresponded with the positions of surface neuston and vertical plankton haul stations. Additional oceanographic stations were occupied in the vicinity of the trackline off Brooks peninsula. An STD-12 (Applied Microsystems Corp.) was used to measure the following parameters of water selected at 2 m depth intervals: temperature, salinity, sigma-t, specific volume anomaly, dynamic height relative to the surface, potential energy relative to the surface, and sound speed. The depths of the STD casts were made to 10 m from the sea bottom or to a maximum depth of 500 m. All data were summarized by standard depths (0, 10, 20, 30, 50, 75, 100, 125 , 150, 175, 200, 225, 250, 300, 400 and 500 m).

LABORATORY PROCESSING AND ANALYSIS

In the laboratory, all of the samples from the April and May surveys were sorted, identified, enumerated, and all sablefish larvae were measured as described in Shaw et al. (1985) and (1987).

The equation for calculating relative abundance (R), expressed as mean number of larvae per 1000 m^3, from the neuston sampler is the same as outlined in the 1984 and 1985 reports by Shaw et al. (1985 and 1987). The parameter for the flowmeter ratio constant (Rc) was changed from 51020 to 26871. Relative abundance estimates from the neuston sampler were calculated for sablefish, Pacific herring (Clupea harengus pallasi), lingcod (Ophiodon elongatus), rockfish sp. (Sebastes sp.) and Pacific sand lance (Ammodytes hexapterus). Other larval fish in the catch were enumerated by station. Subsequent preserving of all larvae and eggs caught in the neuston sampler was in 70 percent alcohol.

Relative abundance estimates using the bongo sampler by net mesh size were calculated for sablefish, Pacific cod (Gadus macrocephalus), Pacific herring, Pacific sand lance and rockfish sp. The equation and ratio constant

(Rc) for calculating relative abundance (R) using the bongo sampler is the same as outlined for the neuston sampler, with the exception that the mouth area of each bongo net (A = 0.2552 m^2) is larger than for the neuston sampler.

Shrinkage Experiment

An experiment was conducted on sablefish larvae to determine the amount of body shrinkage due to initial fixation in a 5 percent seawater solution and then preservation in 70 percent alcohol. A broad size range of freshly caught larvae was selected and measured (FL) to 0.1 millimetre. Each larva was preserved separately in a 5 percent seawater formalin solution and allowed to sit for 24 hr, after which they were again measured and placed back in the formalin solution. This procedure continued every 24 hrs for 5 days. After 10 days they were measured and once again after 15 days, at which time all larvae were transferred into 70% alcohol. They were removed and measured after 24 hrs, placed back into the alcohol, and measured again for the final measurement after 7 days in alcohol.

RESULTS

SURVEY SUMMARY

Neuston Sampling

April: A total of 74 stations was fished at night (Fig. 1). Sixty-nine stations were located on the eight tracklines while the remaining five stations were located inside the three inlets. Nine of the stations were reoccupied during daylight. The set locations for each neuston tow are given in Appendix table 1. A list of the common and scientific names of larval fish collected in the neuston sampler is presented in Table 1.

A total of 8721 larval fish was caught in April from night tows and 96 from day tows (Table 2). Only 4 larvae from the night tows could not be identified. The most abundant fish specie caught in the night tows was Pacific herring (38.8%). Sablefish larvae amounted to only 2.8 % of the total catch of larvae at night. The most abundant fish specie caught in the day tows was Pacific sand lance (27.1%). Sablefish amounted to 11.5% of the total catch from day tows. Sculpin sp. (Cottidae) were the most common fish caught in the night and day neuston tows, occurring at 74.3% and 66.7% of the stations sampled in April and May respectively (Table 3).

May: A total of 42 stations was fished at night (Fig. 2). Eighteen of those stations, were reoccupied during daylight. The set locations for each tow are given in Appendix table 2. A list of the common and scientific names of larval fish collected is presented in Table 4.

A total of 6576 larval fish was caught in May from night tows and 123 from day tows (Table 5). Only 5 larvae could not be identified. The most abundant fish specie caught at night was Pacific sand lance (58.0%). Sablefish amounted to 4.3% of the total catch of larvae at night. The most abundant fish specie caught during the day was prickleback (sp.) (Stichaeidae) (33.3%). Sablefish accounted for 13.8% of the larvae caught in day tows. Sculpin (sp.) were the most common fish specie in the night tows and they were caught at 76.2% of the stations sampled (Table 6). The most common fish specie caught in the day tows was sablefish, occurring at 38.9% of the stations sampled. By comparison, on the same tracklines in April, a total of 5416 larvae was caught in night tows and 91 in day tows. The most abundant fish specie caught in the night tows was Pacific herring (43%) and in the day tows Pacific sand lance (28.6%). Sablefish accounted for 4.2% and 12.1% of the total catch from night and day tows respectively, similar to the May results.

Bongo Sampling

April: Oblique bongo tows were conducted at 13 stations on three tracklines (Pachena Point, Barkley Sound and Nootka Sound) and at two stations inside Kyuquot Sound (Fig. 3). The set locations for each bongo tow are given in Appendix table 3. A list of the common and scientific names of larval fish collected is presented in Table 7.

A total of 495 larval fish was caught in April of which 10 larvae could not be identified (Table 8). The most abundant fish specie was Pacific herring (19.2%). Pacific herring was the most abundant larvae in the 0-200 m depth strata, accounting for 22.5% of the total catch. Rockfish (sp.) accounted for 41.0% of the catch in the 200-500 m strata and 47.1% in the 500-700 m strata. Rockfish (sp.), snailfish (sp.) (Cyclopteridae) and northern lampfish (Stenobrachius leucopsaurus) were caught at all depth strata. One Pacific viperfish (Chauliodus macouni) was caught in the deepest depth strata (500-700 m).

May: Oblique bongo tows were conducted at 9 stations on all four tracklines (Fig. 4). The set locations for each bongo tow are presented in Appendix table 4. A list of the common and scientific names of larval fish collected in May is given in Table 9.

A total of 254 larval fish was caught in May of which three larvae could not be identified (Table 10). The most abundant fish specie caught were rockfish (sp.) (17.3%). Rockfish (sp.) was the most abundant larvae in the 0-200 m depth strata accounting for 18.1% of the total catch . Prickleback (sp.) (31.6%) was the most abundant larvae in the 0-200 m strata, northern lampfish (42.3%) in the 200-500 m strata, and lanternfish (sp.) (Myctophidae) (44.8%) in the 500-700 m strata. Rockfish (sp.) and prickleback (sp.) were caught at all depth strata. Only one sablefish larva was caught in the 200-500 m depth strata.

Vertical Haul Sampling

April: Vertical plankton hauls were made at five stations on the Barkley Sound trackline and at 6 stations in the vicinity of the Pachena Point and Barkley Sound tracklines (Fig. 3). The set locations for each vertical haul are presented in Appendix table 3. A list of the common and scientific names of larval fish collected is given in Table 7.

A total of 158 larval fish was caught in April (Table 8). The most abundant fish specie caught was Pacific sand lance (28.5%). Pacific sand lance was the most abundant larvae in the 200-0 m depth strata, accounting for 28.5% of the total catch. Only unidentified eggs were caught in the deepest strata (700-0 m).

May: Only one vertical plankton haul was made, Stn. 6 on the Barkley Sound trackline (Fig. 4; Appendix table 4). A list of the common and scientific names of larval fish collected in May is given in Table 9. One depth stratum (200-0 m) was selected for the vertical haul resulting in a catch of one prickleback (sp.) and one unidentified egg.

STD Summary

A total of 54 stations in April was occupied for STD casts (Fig. 5; Appendix 5). Forty-four of these stations were located on eight tracklines while the remaining 10 stations were in the vicinity of the Pachena Point, Barkley Sound and Brooks Peninsula tracklines. Forty-one stations corresponded to the neuston tow station positions.

During May a total of 22 stations was occupied on four tracklines (Fig. 6; Appendix table 6). Twenty-one stations corresponded to the neuston tow stations positions.

NEUSTON SAMPLING

SABLEFISH

Sablefish larvae were distributed in the surface waters throughout all of the areas surveyed in April and May. In April, sablefish were caught at 31 stations (42% of the total) on 7 tracklines from Brooks Peninsula to Pachena Point (Fig. 7) for a total of 251 larvae (Table 2.). These larvae composed 2.8% and 11.5% of the total coastwide catch of larvae from night and day tows respectively. In May, they were caught at 24 stations (57%) on four tracklines from Clayoquot Sound to Pachena Point (Fig. 8) for a total of 299 larvae (Table 5). By comparison, on those same tracklines in April, sablefish were caught at 28 stations for a total of 238 larvae (Table 2). They composed 4.2% and 4.3% of the total catch of larvae at night on the four tracklines

during April and May and 12.1% and 13.8% during the day respectively. It is interesting to note that sablefish larvae were generally caught in reasonable numbers during daylight in association with a surface dwelling hydroid Vellela vellela. This was also evident in the 1984 survey (Shaw et al. 1985) where the hydroid was very abundant in the catches.

Relatively large catches of sablefish larvae from night tows during April were made at stations located on the Wickaninnish Bay trackline, and in May at stations on all four tracklines. Relative abundance estimates, expressed as the mean number of larvae pe. 1000 m^3, from single tows at night ranged from 0 to 155.0 in April (Appendix table 7) to 0 to 208.7 in May (Appendix table 8). Stations having the highest relative abundance estimates (>100 larvae per 1000 m^3) from night tows in April were Stn. 36, off Wickaninnish Bay, for two tows (127.3 and 155.0 larvae) and in May Stn. 14, off Pachena Point, (208.7 larvae). Relative abundance estimates from single tows during the day ranged from 0 to 22.1 larvae in April (Appendix table 7) and in May from 0 to 25.3 larvae (Appendix table 8). Stations having the highest relative abundance estimates from day tows were: April Stn. 7, off Pachena Point, (22.1 larvae); May Stn. 40, off Clayoquot Sound, (25.3 larvae). Sablefish larvae in the night neuston tows increased in abundance in the surface waters during April and May as we moved seaward towards the 2000 m isobath, similar to the results from the previous surveys (Shaw et al. 1985 and 1987). No sablefish larvae were caught inside the inlets during April.

The catch rate of sablefish (larvae per tow), at stations for the day-night catch comparison, was higher at night (1.7 and 3.4 larvae) than during the day (1.2 and 1.2 larvae) during April and May.

Approximately 40% of the sablefish larvae in April were caught in night tows at stations on the Wickaninnish Bay trackline and in May 50% were caught at stations on the Pachena Point trackline (Table 11). The highest relative abundance estimates of sablefish larvae in April were off Wickaninnish Bay averaging 25.8 larvae per 1000 m^3 per station; and in May off Clayoquot Sound averaging 24.5 larvae per 1000 m^3 per station.

Sablefish larvae collected in the surface neuston tows ranged in length from 7 to 29 mm in April and from 10 to 35 mm in May (Tables 12 and 13; Fig. 9 respectively). Three modes were identified in the April length frequency at 9, 12-14 and 16 mm. In May, four modes were identified at 14, 19, 22 and 25 mm. The mean length of the larvae in April was 12.7 mm (SE=0.81) and in May 19.4 mm (SE=1.03). The average length of larvae by trackline collected in April was 3.6 to 8.1 mm smaller than for similar tracklines in May. The overall mean length of larvae examined in the 1986 April survey was smaller as compared to surveys during the same period in 1984 (16.6 mm) (Shaw et al. 1985) and in 1985 (14.9 mm) Shaw et al. (1987).

In summary, sablefish larvae in April were caught at more stations located south of Clayoquot Sound towards Pachena Point than north towards Quatsino Sound. However, they were not as abundant at the stations sampled in April as compared to May. The relative abundance by station is somewhat similar along each trackline in April and in May, however in May the abundance by station is higher than in April. Their offshore distribution shows the

same trends as in previous years. The abundance of sablefish off Kyuquot Sound, Clayoquot Sound, Barkley Sound and Pachena Point was higher in 1985 than during this year's survey. However, off Nootka Sound and Wickaninnish Bay, the abundance was higher this year than in 1985. The mean size of the larvae is smaller this year as compared to larvae caught in the same month in previous surveys.

OTHER LARVAL FISH SPECIES

Pacific herring larvae were distributed throughout the surface waters in April and May using the neuston sampler. They were caught at 30 stations (41%) in April on all 8 tracklines (Fig. 10) for a total of 3388 larvae (Table 2). They composed 38.8% of the total coastwide catch of larvae in night tows and 42% in day tows. In May, they were caught at 21 stations (50%) on all 4 tracklines (Fig. 11) for a total of 491 larvae (Table 5). By comparison, on the same 4 tracklines in April, herring were caught at 15 stations for a total of 2330 larvae. They composed 43% and 7.4% of the total catch of larvae at night on the 4 tracklines during April and May and 1.1% and 2.4% during the day respectively. Pacific herring was the most abundant larvae in the April night tows. The largest catches of herring in April were on the Barkley Sound trackline at Stn. 17 with 559 larvae (16.5%) and at Stn. 16 with 554 larvae (16.4%). During May the largest catches of herring were off Pachena Point at Stn. 5 with 80 larvae (16.3%) and at Stn. 2 for 64 larvae (13.0%). During both surveys they were distributed as far offshore as the 2000 m isobath with the majority found in the vicinity of the 100 m isobath. It is interesting to note that in April they were caught at most of the stations along the Barkley Sound trackline and in May along the Pachena Point trackline. The coastwide estimates of relative abundance (larvae per 1000 m^3) from single tows at night ranged from 0 to 3709.3 larvae in April (Appendix table 9) and in May from 0 to 287.7 larvae (Appendix table 10). Stations having the highest relative abundance estimates from night tows in April were Stn. 17 (3347.7 larvae) and Stn. 16 (989.4 larvae) off Barkley Sound; and in May Stn. 2 (297.9 larvae) and Stn. 5 (258.5 larvae) off Pachena Point. Relative abundance estimates from single tows during the day ranged from 0 to 57.8 larvae in April (Appendix table 9), and in May from 0 to 4.8 larvae (Appendix table 10). The relative abundance of herring at each station during this year's survey was higher and they were caught at more stations along the coast and offshore as compared to the results in 1985 (Shaw et al. 1987).

Lingcod larvae were distributed in the surface waters along all tracklines surveyed in April (Fig. 10) and along two tracklines (Wickaninnish Bay and Pachena Point) in May (Fig. 11). Lingcod were caught at 52 stations (70%) in April for a total of 774 larvae (Table 2). They composed 8.9% of the total coastwide catch of larvae in night tows and 3.1% in day tows. In May they were caught at 5 stations (12%) for a total of 9 larvae (Table 5). By comparison, on the same 4 tracklines in April, lingcod were caught at 32 stations for a total of 338 larvae. They composed 6.2% and 0.1% of the total catch of larvae at night on the 4 tracklines during April and May and 3.3% and 0.8% during the day respectively. Almost all of the larvae (99%) in April and all in May were caught at night. The largest catch of lingcod larvae in April was at Stn. 62 off Brooks Peninsula for 159 larvae (13%). In May, the catches

were very small with a maximum of 2 larvae caught at some stations. In April they were distributed as far offshore as the 2000 m isobath. However, the majority were caught in the vicinity of the 100 m isobath. This was evident also for May. Relative abundance estimates (larvae per 1000 m^3) from single tows at night ranged from 0 to 742.6 larvae in April (Appendix table 9) and in May from 0 to 11.9 larvae (Appendix table 10). The station having the highest relative abundance estimates from night tows in April was Stn. 62 (505.9 larvae) off Brooks Peninsula; and in May Stn. 36 (11.9 larvae) off Clayoquot Sound. Relative abundance estimates from single tows during the day in April ranged from 0 to 4.9 larvae; and in May from 0 to 3.8 larvae. The relative abundance of lingcod by station appears to be similar to results from the 1985 survey (Shaw et al. 1987).

Pacific sand lance were common in the neuston catches along each trackline surveyed in April (Fig. 12) and in May (Fig. 13). The larvae were caught at 55 stations (74%) in April for a total of 1700 larvae (Table 2). They composed 19.2% of the total coastwide catch of larvae in night tows and 27.1% in day tows. In May, they were caught at 27 stations (64%) for a total of 3822 larvae (Table 5). By comparison, on the same 4 tracklines in April, sand lance larvae were caught at 34 stations for a total of 522 larvae. They composed 9.6% and 58% of the total catch of larvae at night during April and May and 28.6% and 5.7% during the day respectively. Most of the larvae in April (98%) and in May (99%) were caught at night. The largest catch of Pacific sand lance larvae in April was at Stn. 62 off Brooks Peninsula for 412 larvae (53%), and in May at Stn. 5 off Pachena Point for 720 larvae (19%). In April they were distributed along most of the tracklines out to the 2000 m isobath. However, in May very few larvae were found seaward of the 200 m isobath. Sand lance larvae were caught inside all of the inlets in April, and were very abundant inside Nootka Sound. Relative abundance estimates (larvae per 1000 m^3) from single tows at night in April ranged from 0 to 2310.7 larvae (Appendix table 11); and in May from 0 to 2857.1 larvae (Appendix table 12). The station having the highest relative abundance estimates from night tows in April was Stn. 62 (1517.3 larvae) off Brooks Peninsula; and in May Stn. 4 (2338.7 larvae) off Pachena Point. Relative abundance estimates from single day tows in April ranged from 0 to 47.9 larvae and from 0 to 21.7 larvae in May. The relative abundance of sand lance larvae in this year's survey was higher than in 1985 and they were caught at more stations on similar tracklines compared to last year's survey.

Larval rockfish specie were not common in the neuston catches in April (Fig. 12) or in May (Fig. 13). The larvae were caught at 7 stations (9%) in April on the Kyuquot and Nootka Sound tracklines for a total of 40 larvae (Table 2). They composed 0.4% of the total coastwide catch of larvae in night tows and 1.0% in day tows. In May, they were caught at 11 stations (27%) on the Clayoquot Sound, Wickaninnish Bay and Pachena Point tracklines for a total of 17 larvae (Table 5). By comparison, on the same 4 tracklines in April, no larvae were caught. During May they composed 0.2% and 4.9% of the total catch of larvae in the night and day tows respectively. Approximately 98% of the larvae in April and 94% in May were caught at night. The largest catch of rockfish larvae in April was at Stn. 48 inside Nootka Sound for 30 larvae (75%). In May, the largest catch was 3 larvae (18%) at Stn. 43 off Clayoquot Sound. Their distribution was seaward to the 200 m

isobath in April and deeper than the 2000 m isobath in May. Relative abundance estimates (larvae per 1000 m^3) from single tows at night in April ranged from 0 to 157.2 larvae (Appendix table 11); and in May from 0 to 9.1 larvae (Appendix table 12). Station having the highest relative abundance estimates from night tows in April was Stn. 30 (157.2 larvae) inside Nootka Sound. Relative abundance estimates from single tows during the day in April ranged from 0 to 6.2 larvae and in May from 0 to 10.9 larvae. It is interesting to note that no rockfish were caught at stations south of Nootka Sound in April.

Catches of other larvae, representing 16 taxa, from the April cruise are presented in Appendix table 13. Of these larvae, sculpin (sp.) was the most abundant followed by lanternfish (sp.). During April the majority (36.0%) of the sculpins were caught at stations along the Barkley Sound trackline; and 53.0% of the lanternfish (sp.) were caught at stations along the Pachena Point trackline.

During May, catches of other larvae represented 19 taxa (Appendix table 14). Of these, prickleback (sp.) was the most abundant followed by sculpin (sp.). The majority (32.4%) of the prickleback (sp.) and the sculpin (sp.) 35.8%) were caught at stations along the Wickaninnish Bay trackline.

BONGO AND VERTICAL SAMPLING

Only one sablefish larva was caught using the bongo sampler. It was caught in May at Stn. 10 off Clayoquot Sound at a midwater depth between 200-500 m (Appendix table 16). The larva measured 16.0 mm in length. No sablefish larvae were caught in the vertical hauls.

Pacific herring were common in the bongo tows and vertical hauls. A total of 95 larvae was caught using the bongo sampler at 7 stations in April and 25 larvae at 4 stations in May (Appendix table 15 and 16 respectively). Herring were caught at stations offshore as far as the 2000 m isobath. However, the majority were caught at stations that were positioned seaward to the 200 m isobath. Approximately 79% of the herring in April were caught off Barkley Sound, and in May 60% were off Wickaninnish Bay. All of the herring were caught in the first depth stratum (0-200 m). Estimates of relative abundance (nos. per 1000 m^3) of herring larvae in April and May are presented in Appendix tables 17 and 18 respectively. Pacific herring were present only in the April vertical haul samples. A total of 31 larvae was caught at 5 stations (50%) (Appendix table 15). The majority (81%) of the herring larvae were caught at stations 17 km offshore from Barkley Sound. All larvae were caught in the first depth stratum (200-0 m). No lingcod larvae were caught in either the bongo tows or the vertical hauls.

Pacific cod larvae were found in the bongo tows and vertical haul samples only along the Barkley Sound trackline in April and in the bongo samples along Pachena Point trackline in May. A total of 3 larvae was caught using the bongo sampler at 2 stations in April and 3 larvae at one station in May (Appendix tables 15 and 16 respectively). In both surveys larvae were caught in the vicinity of the 200 m isobath. All of the Pacific cod were caught in the first depth stratum (0-200 m). Estimates of relative abundance of Pacific cod larvae in April and May are presented in Appendix tables 17 and 18 respectively. A total of 7 larvae was caught in the vertical hauls at 4 stations in April (Appendix table 15). The majority of these larvae were caught at stations relatively close to shore off Barkley Sound. All larvae were caught in the first depth stratum (200-0 m).

Pacific sand lance were commonly found in the bongo tows and vertical haul samples in April, however were not so common in the May bongo samples. A total of 27 larvae was caught using the bongo sampler at 9 stations on all tracklines in April and 9 larvae at 4 stations on the Clayoquot Sound, Wickaninnish Bay and Pachena Point tracklines (Appendix tables 15 and 16 respectively). The majority of the larvae were caught at stations situated seaward of the 100 m isobath within the first depth stratum (0-200 m). In April, most of the larvae were caught at stations off Barkley Sound and in May off Pachena Point. Relative abundance estimates for Pacific sandlance larvae in April and May are presented in Appendix tables 19 and 20 respectively. A total of 45 larvae was caught in the vertical hauls at 3 stations in April (Appendix table 15). These were all situated close to shore off Barkley Sound within the first depth stratum (200-0 m).

Rockfish (sp.) were very common in both the bongo and vertical haul samples during April and in the bongo samples in May. A total of 83 larvae was caught in the bongo tows at 11 stations on all tracklines in April and 44 larvae at 8 stations on all tracklines in May (Appendix tables 15 and 16 respectively). In both surveys larvae were caught at stations distributed seaward along the transects to the 2000 m isobath. The majority of the larvae were caught in the first depth stratum (0-200 m). Most of the rockfish in April and May were caught at stations off Pachena Point. Estimates of relative abundance of rockfish larvae in April and May are presented in Appendix tables 19 and 20 respectively. A total of 4 larvae was caught in the vertical hauls at 3 stations in April (Appendix table 15). These larvae were caught at stations off Pachena Point in the vicinity of the 200 m isobaths within the first depth strata (200-0 m).

SURFACE OCEAN PROPERTIES

Physical oceanographic data describing the surface waters from Clayoquot Sound to Pachena Point during April and May are presented in Figures 14-21. The following water parameters presented in the figures are: temperature, salinity, density, and horizontal velocity of the surface waters. Surface temperature and salinity values were slightly higher in May

than in April. Density was a mirror image of salinity. The interesting event was the lower velocity of the surface currents in May as compared to April. This may have an effect on the distribution and availability of larvae at either times of the survey.

SHRINKAGE EXPERIMENT

A total of 21 sablefish larvae ranging in size from 14.1 to 38.1 mm were examined for shrinkage as a result of preservation methods. The results of the experiment are presented in Table 14. The majority (70%) of shrinkage occurs within the first day in the 5% seawater formalin solution. A simple linear regression (Zar 1974) was conducted to compare overall percent loss to the original measurements of fresh larvae. The equation describing the overall loss in length is as follows:

1 $Y\ (mm) = a + b\ x\ (mm)$ where

$a = 6.83$

2

$b = -0.08$

The correlation of percent loss to length was low, $R^2 = 0.10$ which suggests that larval size does not have a significant impact on shrinkage.

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Table 1. Common and scientific names of larval fish captured in the neuston tows. R/V G.B. REED, April 2-18, 1986.

Common name	Scientific name
Pacific herring	Clupea harengus pallasi
Lingcod	Ophiodon elongatus
Pacific sand lance	Ammodytes hexapterus
Sculpin (sp.)	Cottidae
Blue lanternfish (sp.)	Tarletonbeania crenularis
Irish Lord (sp.)	Hemilepidotus sp.
Prickleback (sp.)	Stichaeidae
Smelt (sp.)	Osmeridae
Sablefish	Anoplopoma fimbria
Dwarf wrymouth	Lyconectes aleutensis
Greenling (sp.)	Hexagrammidae
Lemon sole	Parophrys vetulus
Snailfish (sp.)	Cyclopteridae
Rockfish (sp.)	Scorpaenidae
Gunnel (sp.)	Pholidae
Starry flounder	Platichthys stellatus
Arrowtooth flounder	Atheresthes stomias
Pacific cod	Gadus macrocephalus
Three spined stickleback	Gasterosteus aculeatus
Cabezon	Scorpaenichthys marmoratus
Poacher (sp.)	Agonidae

Table 2. Larval fish collected in the neuston tows ranked in order of numerical abundance. Larval fish caught at stations on the same tracklines occupied in May are indicated in brackets. R/V G.B. REED, April 2-18, 1986.

Larvae	Total			
	Number		Percent	
	Night	Day	Night	Day
Pacific herring	3384 (2330)	4 (1)	38.8 (43.0)	4.2 (1.1)
Pacific sand lance	1674 (522)	26 (26)	19.2 (9.6)	27.1 (28.6)
Lingcod	774 (338)	3 (3)	8.9 (6.2)	3.1 (3.3)
Sculpin (sp.)	585 (451)	23 (22)	6.7 (8.3)	24.0 (24.2)
Lanternfish (sp.)	441 (409)	0 (0)	5.1 (7.6)	0 (0)
Irish lord (sp.)	411 (245)	3 (3)	4.7 (4.5)	3.1 (3.3)
Prickleback (sp.)	333 (310)	0 (0)	3.8 (5.7)	0 (0)
Smelt (sp.)	243 (121)	7 (7)	2.9 (2.2)	7.3 (7.7)
Sablefish	240 (227)	11 (11)	2.8 (4.2)	11.5 (12.1)
Dwarf wrymouth	215 (189)	0 (0)	2.5 (3.5)	0 (0)
Greenling (sp.)	204 (178)	9 (9)	2.3 (3.3)	9.4 (9.9)
Lemon sole	72 (52)	8 (8)	0.8 (1.0)	8.3 (8.8)
Snailfish (sp.)	70 (25)	1 (1)	0.8 (0.5)	1.0 (1.1)
Rockfish (sp.)	39 (0)	1 (0)	0.4 (0.0)	1.0 (0)
Gunnel (sp.)	21 (9)		0.2 (0.2)	
Starry flounder	3 (3)		0.05(0.1)	
Arrowtooth flounder	2 (1)		0.02(0.02)	
Pacific cod	2 (0)		0.02(0.0)	
Three spined stickleback	2 (1)		0.02(0.02)	
Cabezon	1 (0)		0.01(0.0)	
Poacher (sp.)	1 (1)		0.01(0.02)	
Unidentified larvae	4 (4)		0.05(0.07)	
Total	8721 (5416)	96 (91)		
Unidentified eggs	516	594		

Table 3. Rank abundance of larvae occurring in the stations sampled using the neuston sampler. R/V G.B. REED, April 2-18, 1986.

Larvae	Number of stations		Percent occurrence	
	Night	Day	Night	Day
Sculpin (sp.)	55	6	74.3	66.7
Pacific sand lance	53	4	71.6	44.4
Greenling (sp.)	51	4	68.9	44.4
Lingcod	51	2	68.9	22.2
Dwarf wrymouth	38	0	51.4	0
Irish lord (sp.)	36	1	48.6	11.1
Sablefish	31	3	41.9	33.3
Pacific herring	30	2	40.5	22.2
Snailfish (sp.)	23	1	31.1	11.1
Smelt (sp.)	22	2	29.7	22.2
Lanternfish (sp.)	22	0	29.7	0
Lemon sole	17	2	23.0	22.2
Gunnel (sp.)	15	0	20.3	0
Prickleback (sp.)	10	0	13.5	0
Rockfish (sp.)	6	1	8.1	11.1
Arrowtooth flounder	2	0	2.7	0
Three spined stickleback	2	0	2.7	0
Cabezon	1	0	1.4	0
Poacher (sp.)	1	0	1.4	0
Pacific cod	1	0	1.4	0
Starry flounder	1	0	1.4	0
Unidentified larvae	3	0	4.1	0
Unidentified eggs	26	3	35.1	33.3

Table 4. Common and scientific names of larval fish captured in the neuston tows. R/V G.B. REED, May 10-18, 1986.

Common name	Scientific name
Pacific sand lance	*Ammodytes hexapterus*
Blue lanternfish	*Tarletonbeania crenularis*
Pacific herring	*Clupea harengus pallasi*
Prickleback (sp.)	Stichaeidae
Sculpin (sp.)	Cottidae
Sablefish	*Anoplopoma fimbria*
Smelt (sp.)	Osmeridae
Irish lord (sp.)	*Hemilepidotus* sp.
Greenling (sp.)	Hexagrammidae
Gunnel (sp.)	Pholidae
Lemon sole	*Parophrys vetulus*
Snailfish (sp.)	Cyclopteridae
Rockfish (sp.)	Scorpaenidae
Poacher (sp.)	Agonidae
Lingcod	*Ophiodon elongatus*
Dover sole	*Microstomus pacificus*
Pacific cod	*Gadus macrocephalus*
Dwarf wrymouth	*Lyconectes aleutensis*
Rex sole	*Glyptocephalus zachirus*
Walleye pollock	*Theragra chalcogramma*
Wolf-eel	*Anarrhichthys ocellatus*

Table 5. Larval fish collected in the neuston tows ranked in order of numerical abundance. R/V G.B. REED, May 10-18, 1986.

	Total			
	Number		Percent	
Larvae	Night	Day	Night	Day
Pacific sand lance	3815	7	58.0	5.7
Blue lanternfish	895	0	13.6	0
Pacific herring	488	3	7.4	2.4
Prickleback (sp.)	416	41	6.3	33.3
Sculpin (sp.)	296	12	4.5	9.8
Sablefish	282	17	4.3	13.8
Smelt (sp.)	110	1	1.7	0.8
Irish lord (sp.)	77	6	1.2	4.9
Greenling (sp.)	56	8	0.9	6.5
Gunnel (sp.)	37	0	0.6	0
Lemon sole	30	0	0.5	0
Snailfish (sp.)	24	0	0.5	0
Rockfish (sp.)	11	6	0.2	4.9
Poacher (sp.)	11	1	0.2	0.8
Lingcod	8	1	0.1	0.8
Dover sole	5	0	0.08	0
Pacific cod	5	18	0.08	14.6
Dwarf wrymouth	1	0	0.02	0
Rex sole	1	0	0.02	0
Sand sole	1	0	0.02	0
Sanddab (sp.)	1	0	0.02	0
Walleye pollock	1	0	0.02	0
Wolf-eel	1	0	0.02	0
Flathead sole	0	1	0.00	0.8
Unidentified larvae	4	1	0.06	0.8
Total	6576	123		
C-O sole eggs	3	0		
Unidentified eggs	122	136		

Table 6. Rank abundance of larvae occurring in the stations sampled using the neuston sampler. R/V G.B. REED, May 10-18, 1986.

Larvae	Number of stations		Percent occurrence	
	Night	Day	Night	Day
Sculpin (sp.)	32	3	76.2	16.7
Irish lord (sp.)	27	4	64.3	22.2
Pacific sand lance	26	3	61.9	16.7
Greenling (sp.)	25	4	59.5	22.2
Sablefish	24	7	57.1	38.9
Prickleback (sp.)	20	3	47.6	16.7
Pacific herring	19	2	45.2	11.1
Smelt (sp.)	14	1	33.3	5.6
Blue lanternfish	14	0	33.3	0
Snailfish (sp.)	13	0	31.0	0
Poacher (sp.)	10	1	23.8	5.6
Rockfish (sp.)	9	3	21.4	16.7
Lemon sole	6	0	14.3	0
Lingcod	5	1	11.9	5.6
Dover sole	5	0	11.9	0
Gunnel (sp.)	3	0	7.1	0
Pacific cod	2	1	4.8	5.6
Dwarf wrymouth	1	0	2.4	0
Sand sole	1	0	2.4	0
Sanddab (sp.)	1	0	2.4	0
Rex sole	1	0	2.4	0
Walleye pollock	1	0	2.4	0
Wolf-eel	1	0	2.4	0
Flathead sole	0	1	0	5.6
Unidentified larvae	2	1	4.8	5.6
C-O sole eggs	0	2	0	11.1
Unidentified eggs	21	7	50.0	38.9

Table 7. Common and scientific names of larval fish captured in the bongo and vertical hauls. R/V G.B. REED, April 2-18, 1986.

Common name	Scientific name
Pacific cod	Gadus macrocephalus
Walleye pollock	Theragra chalcogramma
Pacific herring	Clupea harengus pallasi
Pacific sand lance	Ammodytes hexapterus
Deepsea smelt (sp.)	Bathylagidae
Smelt (sp.)	Osmeridae
Veiled anglemouth	Cyclothone microdone
Northern lampfish	Stenobrachius leucopsarus
Pacific viperfish	Chauliodus macouni
Slender snipe eel	Nemichthys scolopaceus
Prickleback (sp.)	Stichaeidae
Sculpin (sp.)	Cottidae
Dwarf wyrmouth	Lyconectes aleutensis
Gunnel (sp.)	Pholidae
Snailfish (sp.)	Cyclopteridae
Ronquil (sp.)	Bathymasteridae
Red brotula	Brosmophycis marginata
Rockfish (sp.)	Scorpaenidae
Butter sole	Isopsetta isolepis
Sand sole	Psettichthys melanostictus
Slender sole	Lyopsetta exilis
English sole	Parophrys vetulus
Flathead sole	Hippoglossoides elassodon
Arrowtooth flounder	Atheresthes stomias

Table 8. Larval fish and eggs collected in the bongo tows and vertical hauls ranked in order of abundance by the bongo sampler. R/V G.B. REED, April 2-18, 1986.

Species	Bongo depth strata (m)				Vertical haul depth strata (m)		
	0-200	200-500	500-700	T	200-0	700-0	T
Pacific herring	95	-	-	95	41	-	41
Rockfish (sp.)	51	16	16	83	4	-	4
Smelt (sp.)	61	-	-	61	34	-	34
Prickleback (sp.)	53	1	-	54	8	-	8
Snailfish (sp.)	31	1	1	33	2	-	2
Pacific sand lance	28	-	-	28	45	-	45
Northern lampfish	11	10	4	25	-	-	0
Butter sole	14	1	4	19	9	-	9
English sole	18	1	-	19	2	-	2
Walleye pollock	15	-	-	15	2	-	2
Slender sole	14	-	-	14	-	-	0
Veiled anglemouth	-	2	5	7	1	-	1
Sculpin (sp.)	4	1	1	6	2	-	2
Dwarf wrymouth	3	2	-	5	-	-	0
Gunnel (sp.)	4	-	-	4	1	-	1
Slender sole	4	-	-	4	-	-	0
Pacifc cod	3	-	-	3	7	-	7
Arrowtooth flounder	3	-	-	3			
Flathead sole	2	-	-	2			
Deepsea smelt (sp.)	-	1	-	1			
Pacific viperfish	-	-	1	1			
Slender viper eel	-	1	-	1			
Ronquil (sp.)	1	-	-	1			
Red Brotula	1	-	-	1			
Unidentified larvae	6	2	2	10			
Total	422	39	34	495	158	0	158
Unidentified eggs	171	17	15	203	20	3	23

Table 9. Common and scientific names of larval fish captured in the bongo and vertical hauls. R/V G.B. REED, May 10-18, 1986.

Common name	Scientific name
Pacific tomcod	Microgadus proximus
Sablefish	Anoplopoma fimbria
Pacific cod	Gadus macrocephalus
Walleye pollock	Theragra chalcogramma
Pacific herring	Clupea harengus pallasi
Pacific sand lance	Ammodytes hexapterus
Deepsea smelt (sp.)	Bathylagidae
Smelt (sp.)	Osmeridae
Veiled anglemouth	Cyclothone microdone
Northern lampfish	Stenobrachius leucopsarus
Lanternfish (sp.)	Myctophidae
Prickleback (sp.)	Stichaeidae
Sculpin (sp.)	Cottidae
Dwarf wrymouth	Lyconectes aleutensis
Poacher (sp.)	Agonidae
Cabezon	Scorpaenichthys marmoratus
Snailfish (sp.)	Cyclopteridae
Rockfish (sp.)	Scorpaenidae
Butter sole	Isopsetta isolepis
Flathead sole	Hippoglossoides elassodon
Rex sole	Glyptocephalus zachirus
Dover sole	Microstomus pacificus

Table 10. Larval fish and eggs collected in the bongo tows and vertical hauls ranked in order of abundance by the bongo sampler. R/V G.B. REED, May 10-18, 1986.

Species	Bongo depth strata (m)				Vertical haul depth strata (m)
	0- 200	200-500	500-700	T	200-0
Rockfish (sp.)	36	2	6	44	
Prickleback (sp.)	30	1	1	32	1
Pacific herring	25	-	-	25	
Lanternfish (sp.)	2	8	13	23	
Snailfish (sp.)	20	1	-	21	
Northern lampfish	-	11	3	14	
Butter sole	13	-	-	13	
Rex sole	13	-	-	13	
Walleye pollock	11	-	-	11	
Smelt (sp.)	10	-	-	10	
Pacific sand lance	9	-	-	9	
Sculpin (sp.)	8	-	1	9	
Pacific cod	7	-	-	7	
Flathead sole	4	-	-	4	
Pacific tomcod	3	-	-	3	
Veiled anglemouth	1	1	1	3	
Poacher (sp.)	3	-	-	3	
Deepsea smelt (sp.)	1	-	1	2	
Cabezon	-	1	1	2	
Sablefish	-	1	-	1	
Dwarf wrymouth	1	-	-	1	
Dover sole	1	-	-	1	
Unidentified larvae	1	-	2	3	
Total	199	26	29	254	1
Unidentified eggs	10	17	7	34	1

Table 11. Relative abundance estimates of larval sablefish from neuston tows by station and by trackline for April and May, 1986. (N = night tows; D = day tows.)

Trackline		April survey					May survey				
		Total stns.	Stns. with larvae	Total caught	$\bar{x}$ FL (mm)	Nos./1000m^3/stn. trackline	Total stns.	Stns. with larvae	Total caught	$\bar{x}$ FL (mm)	Nos./1000m^3/stn. trackline
Quatsino Sound	(N)	5	0	0	0	0					
Brooks Peninsula	(N)	6	1	1	12.0	0.5					
Kyuquot Sound	(N)	5	1	1	18.0	0.5					
	(D)	2	0	0	0	0					
Nootka Sound	(N)	6	1	11	13.8	7.7					
Clayoquot Sound	(N)	11	5	39	13.4	11.7	8	6	44	20.2	24.5
	(D)	0	0	0	0	0	4	3	9	23.8	15.0
Wickaninnish Bay	(N)	10	8	96	10.9	25.8	10	6	61	18.5	15.5
	(D)	0	0	0	0	0	5	3	6	20.8	6.5
Barkley Sound	(N)	12	5	28	12.4	5.1	10	4	43	20.5	22.1
	(D)	3	0	0	0	0	3	0	0	0	0
Pachena Point	(N)	14	10	64	14.7	11.0	14	8	140	19.0	23.3
	(D)	4	3	11	15.4	10.8	6	1	2	19.0	1.6
Total	(N)	69	31	240			42	24	282		
	(D)	9	3	11			18	7	17		

Table 12. Size composition of sablefish larvae caught in the neuston sampler by station and by locality. R/V G.B. REED, April 2-18, 1986.

Fork length (mm)	PACHENA POINT															
	Day tows				Night tows											
	5	7	9	T	1	2	3	4	8	10	11	12	13	14	T	Total
7																
8														4	4	4
9												1		2	3	3
10										1		2		2	5	5
11										0		1		0	1	1
12		1		1		2	1			1		2		0	6	7
13		1	1	2		1				0		0	1	0	2	4
14		1	1	2		2				0	1	1	3	4	11	13
15		2	1	3		2				0	1	0	0	2	5	8
16		1	0	1		4		1	1	1	0	2	0	1	10	11
17			0	0		0		0			0	1	0	5	6	6
18			1	1		0		2			1	0	1	1	5	6
19				0	1	0		0				0	0		1	1
20				0		0		0				0	1		1	1
21	1			1		0		0				0			0	1
22						1		0				0			1	1
23						0		0				1			1	1
24						0		0							0	0
25						0		0							0	0
26						0		0							0	0
27						0		0							0	0
28						0		1							1	1
29						1									1	1
Total	1	6	4	11	1	13	1	4	1	3	3	11	6	21	64	75
$\overline{FL}$				15.4											14.7	

Table 12 (cont'd)

Fork length (mm)	BARKLEY SOUND						WICKANINNISH BAY								
	16	20	23	25	26	T	27	30	31	32	33	34	35	36	T
7					1	1									
8					2	2				1			1	14	16
9	1		2	1	3	7		4	1	0			2	24	31
10	0	1		1		2		2	3	0				12	17
11	0	0		2		2		2	2	3				1	8
12	0	0		5		5	1	1	0	1				2	5
13	0	0		1		1		0	0	1	1			2	4
14	0	0		0		0		0	0					0	0
15	1	0		1		2		2	0					3	5
16	1	0		0		1		0	1					1	2
17		0		0		0		1	0						1
18		1		1		2		2	0						2
19				0		0		0	1			1			2
20				1		1		0	0			0			0
21				1		1		1	0			0			1
22				0		0			1			0			1
23				1		1						0			0
24												1			1
25															
26															
27															
28															
29															
Total	3	2	2	15	6	28	1	15	9	6	1	2	3	59	96
$\overline{FL}$						12.4									10.9

Table 12 (cont'd)

Fork length (mm)	CLAYOQUOT SOUND						NOOTKA SOUND		KYUQUOT SOUND	
	41	44	45	46	47	T	54	T	58	T
7										
8										
9										
10		1			2	3				
11		2	1	1	2	6				
12		6	1	0	4	11	1	1		
13		1	2	1	1	5	5	5		
14		1	3	1	2	7	3	3		
15		0	0		0	0	0	0		
16		0	1		0	1	1	1		
17	1	0	1		1	3	1	1		
18		0			0	0			1	1
19		1			0	1				
20					0	0				
21					0	0				
22					2	2				
23										
24										
25										
26										
27										
28										
29										
Total	1	12	9	3	14	39	11	11	1	1
$\overline{FL}$						13.4		13.8		18.0

Table 12 (cont'd)

Fork length (mm)	BROOKS PENINSULA		Survey total		Grand total
	67	T	Day	Night	
7					
8				1	1
9				22	22
10				41	41
11				27	27
12	1	1		17	17
13			1	29	30
14			2	17	19
15			2	21	23
16			3	12	15
17			1	15	16
18			0	11	11
19			1	10	11
20			0	4	4
21			0	2	2
22			1	2	3
23				4	4
24				2	2
25				1	1
26				0	0
27				0	0
28				0	0
29				1	1
				1	1
Total	1	1	11	240	251
$\overline{FL}$		12.0	15.1	12.3	12.7

Table 13. Size composition of sablefish larvae caught in the neuston sampler by station and by locality. R/V G.B. REED, May 10-18, 1986.

Fork length (mm)	PACHENA POINT												BARKLEY SOUND				
	Day tow		Night tows														
	9	T	5	7	9	10	11	12	13	14	T	Total	21	22	23	24	T
10										2	2	2					
11										1	3	3					
12									2	14	14	14					
13				1			1		0	10	15	15			1		1
14							0		3	5	9	9			1		1
15							0		4	6	8	8			0	1	2
16			1				0		2	2	4	4			2	0	0
17						1	0		1	6	8	8		1	0	1	4
18						2	1		1	1	7	7		1	4	0	4
19	2	2				3	3	1	2	8	19	21	2	0	0	2	6
20						1	0	2	3	3	4	4	1	1	4	0	2
21						0	0	0	0	0	1	1	0	0	2	0	2
22						0	4	0	1	2	9	9	1	1	0	0	8
23						0	1	2	1	5	8	8	3	2	1	2	3
24						1	1	1	1	0	1	1	1	0	0	1	3
25					1	0	1	0	0	1	7	7	0	0	1	1	1
26					1	0	0	0	3	2	4	4	1	0	0	0	2
27						1	1	3	1	0	7	7	0	1	1	2	1
28							0	0	2	1	4	4	1	1		1	1
29							1	0		2	7	7	0	0			2
30							1	1		0	2	2	1	1			1
31								0		1	1	1					1
32								0		1	2	2					
33								1		1	1	1					
34										0	1	1					
35										1	2	2					
2.																	
Total	2	2	1	1	2	9	14	10	27	76	140	142	11	8	14	10	43
$\overline{FL}$		19.0									19.0						20.5

Table 13 (cont'd)

Fork length (mm)	WICKANINNISH BAY											
	Day tows				Night tows							
	30	32	34	T	29	30	31	32	33	34	T	Total
10												
11										1	1	1
12									1	0	1	1
13								1	0	0	1	1
14							1	0	6	0	7	7
15							0	1	4	0	5	5
16					1		0	1	4	0	6	6
17							0	0	2	1	3	3
18	1		1	2		1	0	0	1	0	2	4
19	0			0		0	1	3	3	2	9	9
20	1			1		0	0	4	0	1	5	6
21	0			0		0	0	5	1		6	6
22	1			1		0	2	0	1		3	4
23	1			1		0	0	1	1		2	3
24		1		1		0	0	0	0		0	1
25						0	1	0	1		2	2
26						0		1			1	1
27						0					0	0
28						0					0	0
29						0					0	0
30						0					0	0
31						1					1	1
32												
33												
34												
35												
Total	4	1	1	6	1	2	5	17	25	5	55	61
$\overline{FL}$				20.8							18.5	

Table 13 (cont'd)

CLAYOQUOT SOUND

Fork length (mm)	Day tows			Night tows								Survey total		Grand total
	38	39	T	37	38	39	40	41	42	T	Total	Day	Night	
10													2	2
11									1	1	1		5	5
12									0	0	0		16	16
13						3			0	3	3		20	20
14						1	2		0	3	3		21	21
15						0	0		0	0	0		13	13
16					1	0	2		2	5	5		19	19
17	1		1		0	1	0		1	2	3	1	14	15
18	0		0	1	0	0	1		0	2	2	2	15	17
19	0		0		0	0	2	1	1	4	4	2	38	40
20	0	1	1		0	1	3	0	0	4	5	2	15	17
21	0	0	0		2	0	0	1	3	6	6	0	15	15
22	0	1	1		1	0	1	0	1	3	4	2	23	25
23	0	1	1		1	1	0	0	2	4	5	2	17	19
24	0	0	0				1	0	0	1	1	1	5	6
25	0	1	1					0	0	0	1	1	10	11
26	1	2	3					0	1	1	4	3	7	10
27	0		0					0	1	1	1	0	10	10
28	0		0					0	0	0	0	0	3	3
29	1		1					0	0	0	1	1	2	3
30								0	0	0	0		2	2
31								0	2	2	2		4	4
32								0	1	1	1		2	2
33								0		0	0		0	0
34								0		0	0		1	1
35								1		1	1		3	3
Total	3	6	9	1	5	7	12	3	16	44	53	17	282	299
$\overline{FL}$			23.8							20.2		22.2	19.1	19.4

Table 14. Reduction in body length (mm) of larval sablefish preserved initially in 10% seawater formalin solution and later in 70% alcohol.

Fork length (mm)	10% seawater formalin solution			70% isopropanol		Overall percent loss
	1 day	5 days	10 days	1 day	7 days	
14.1	13.5	13.5	13.3	13.3	13.2	6.4
16.0	15.0	15.0	14.5	14.9	14.9	6.9
17.0	16.5	16.3	16.3	16.0	16.0	5.9
19.2	19.1	19.0	18.9	18.6	18.5	3.7
19.9	19.0	19.0	18.8	18.8	18.8	5.5
20.2	19.5	19.5	19.5	19.5	19.4	4.0
22.0	21.2	21.2	21.2	21.2	21.2	3.6
23.2	22.2	22.1	22.1	22.1	22.0	5.2
24.3	23.0	23.1	23.0	23.0	22.8	6.2
24.5	23.0	23.0	23.0	22.8	22.8	6.9
24.5	24.5	24.1	24.1	24.0	24.0	2.0
25.0	24.0	24.0	24.0	23.5	23.5	6.0
25.5	24.9	24.9	24.8	24.8	24.8	2.8
26.0	25.1	25.0	25.0	24.8	24.8	4.6
27.1	25.9	25.6	25.6	25.6	25.6	5.5
29.0	28.0	28.0	28.0	27.9	27.8	4.1
30.0	29.0	29.0	28.0	28.0	28.0	6.7
31.2	30.2	30.1	30.0	30.0	30.0	3.9
32.2	31.0	31.0	31.0	31.0	31.0	3.7
33.0	33.0	33.0	32.6	32.6	32.5	1.5
38.1	36.2	36.2	36.1	36.1	36.0	5.5

FIGURES

Fig. 1. Neuston stations occupied by the R/V G.B. REED, April 2-18, 1986.

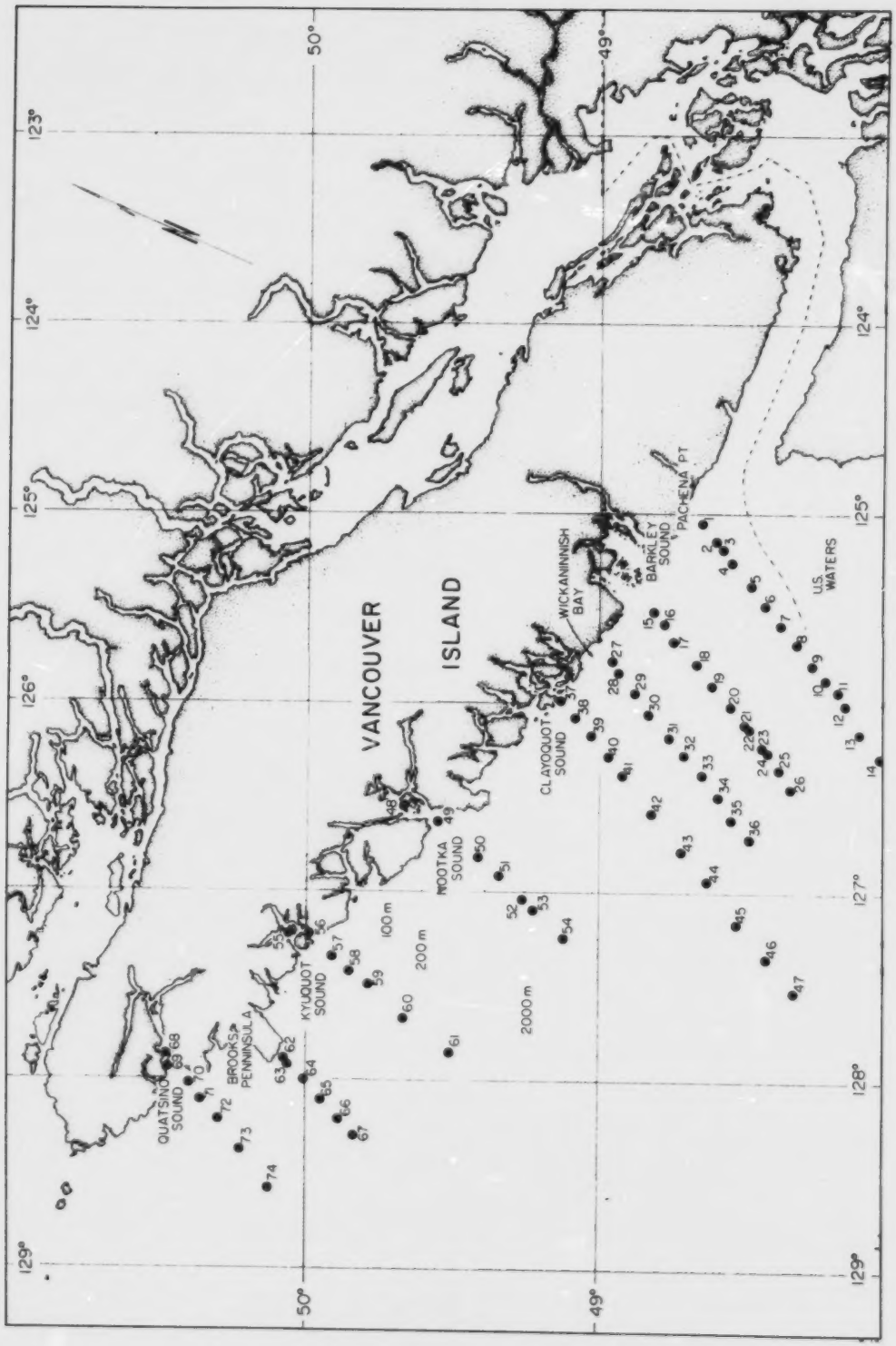

VANCOUVER
ISLAND
QUATSINO SOUND
BROOKS PENNINSULA
KYUQUOT SOUND
NOOTKA SOUND
CLAYOQUOT SOUND
WICKANINNISH BAY
BARKLEY SOUND
PACHENA PT
U.S. WATERS
100 m
200 m
2000 m
129°
128°
127°
126°
125°
124°
123°
50°
49°

Fig. 2. Neuston stations occupied by the R/V G.B. REED, May 10-18, 1986.

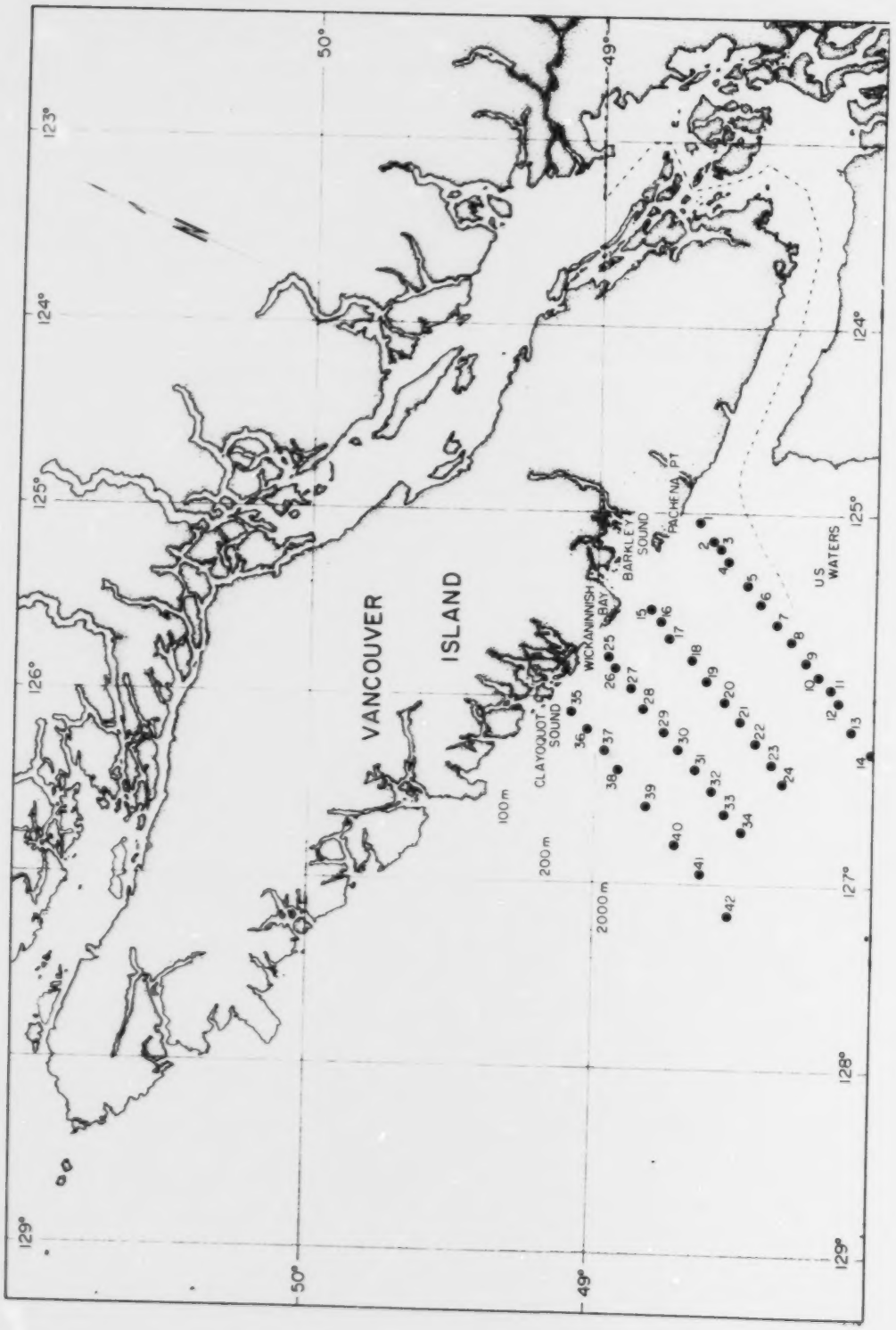

VANCOUVER
ISLAND
CLAYOQUOT SOUND
WICKANINNISH BAY
BARKLEY SOUND
PACHENA PT
US WATERS
100m
200m
2000m
129°
128°
127°
126°
125°
124°
123°
50°
49°

Fig. 3. Set locations for the bongo tows and vertical plankton hauls. R/V G.B. REED, April 2-18, 1986.

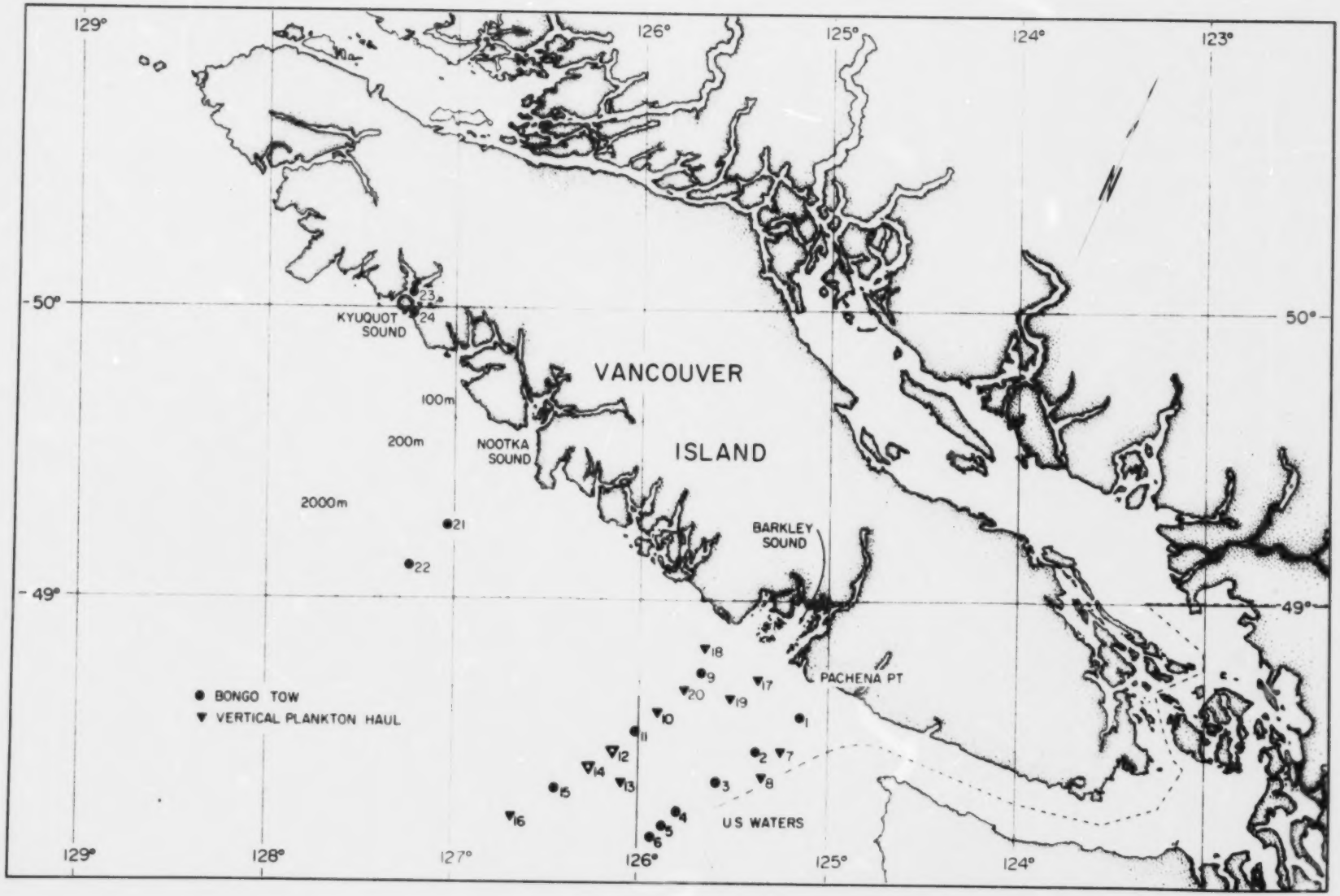

129°
126°
125°
124°
123°
50°
49°
KYUQUOT SOUND
VANCOUVER ISLAND
100m
200m
2000m
NOOTKA SOUND
BARKLEY SOUND
PACHENA PT
US WATERS
● BONGO TOW
▼ VERTICAL PLANKTON HAUL
129°
128°
127°
126°
125°
124°

Fig. 4. Set locations for the bongo tows and vertical plankton haul. R/V G.B. REED, May 10-18, 1986.

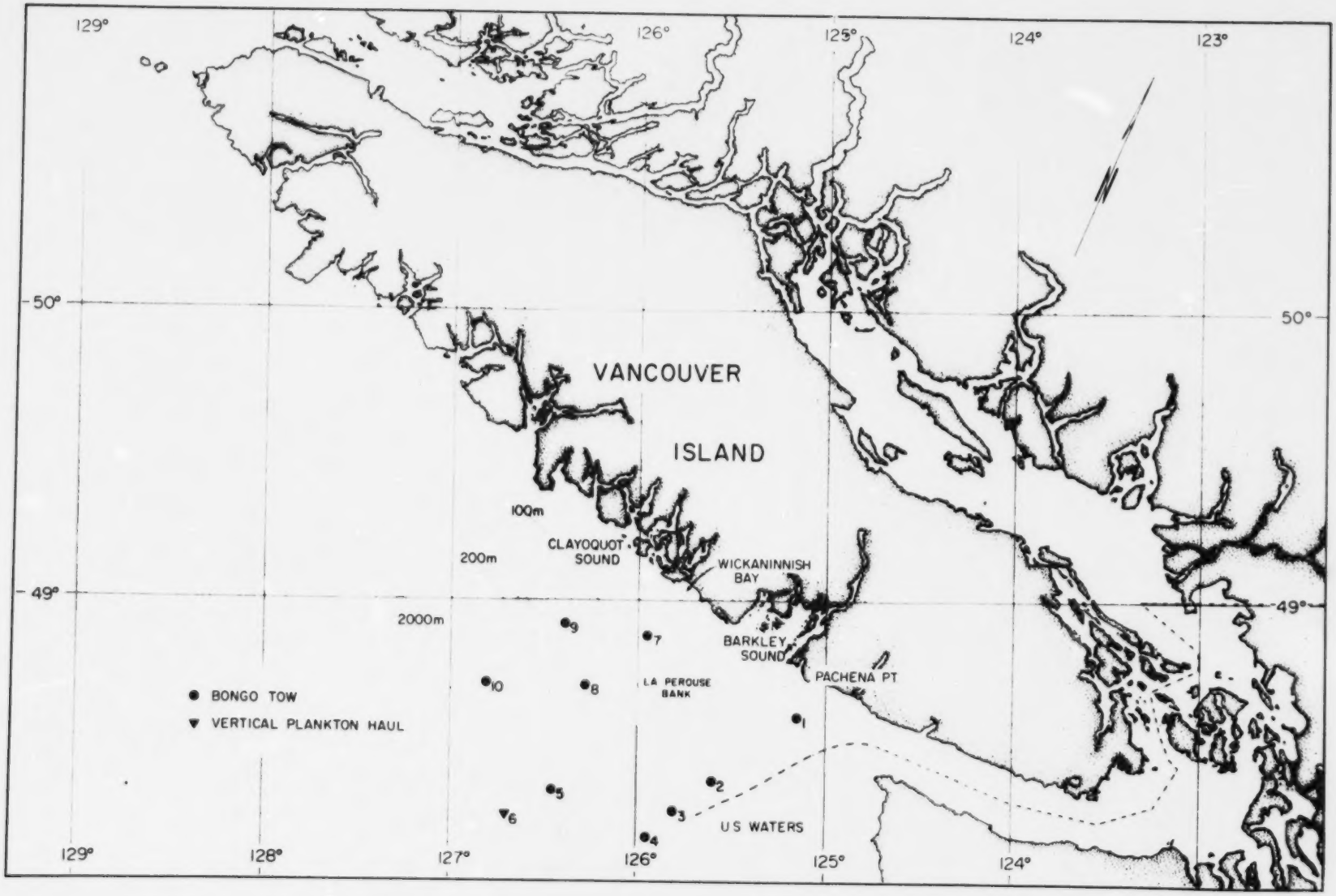

129°
126°
125°
124°
123°
50°
VANCOUVER
ISLAND
100m
200m
2000m
CLAYOQUOT SOUND
WICKANINNISH BAY
BARKLEY SOUND
PACHENA PT
LA PEROUSE BANK
49°
BONGO TOW
VERTICAL PLANKTON HAUL
US WATERS
129°
128°
127°
126°
125°
124°

Fig. 5. STD stations occupied by the R/V G.B. REED, April 2-18, 1986.

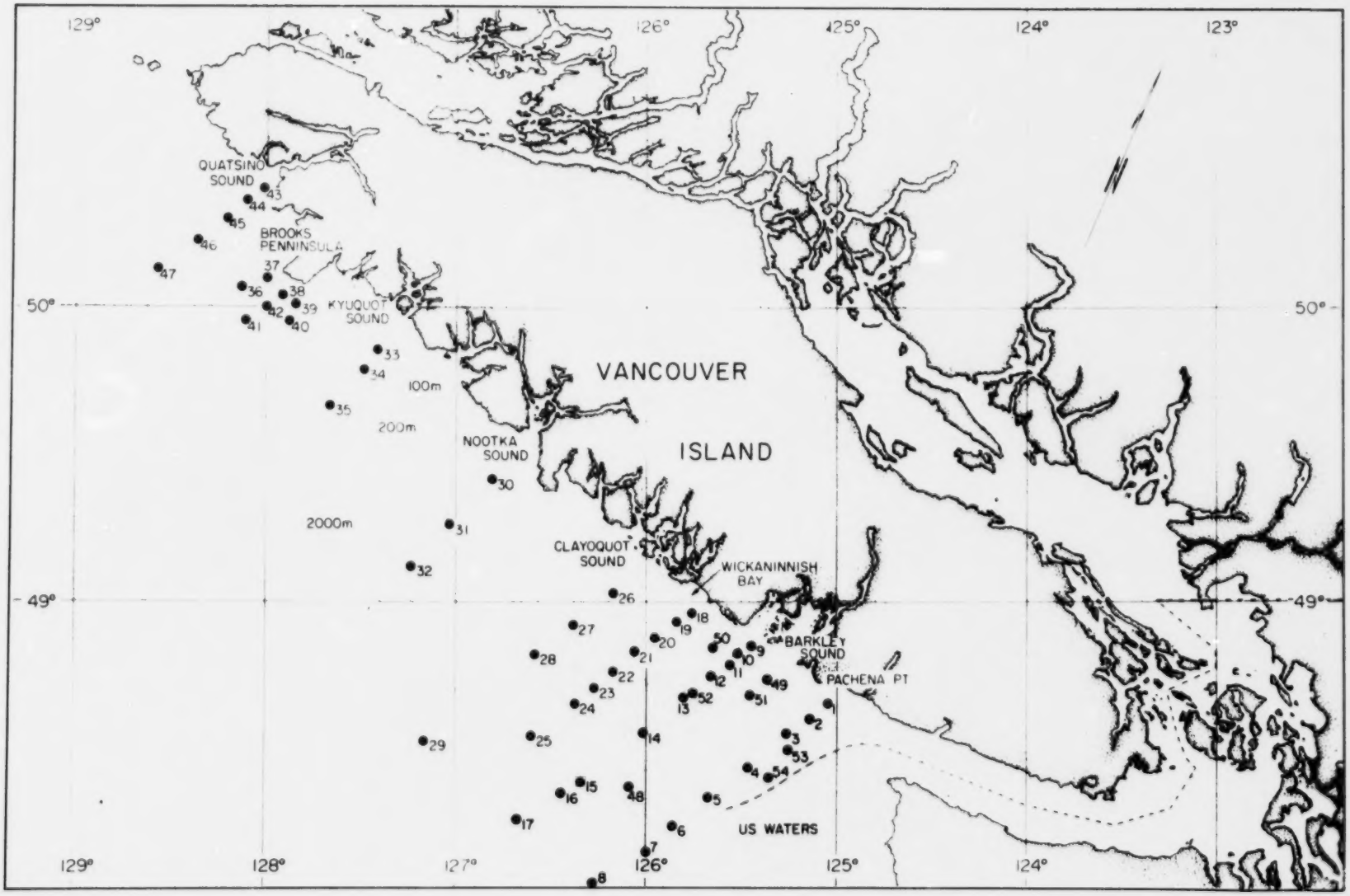

129°
126°
125°
124°
123°
QUATSINO SOUND
BROOKS PENNINSULA
KYUQUOT SOUND
50°
VANCOUVER
ISLAND
100m
200m
NOOTKA SOUND
2000m
CLAYOQUOT SOUND
WICKANINNISH BAY
BARKLEY SOUND
PACHENA PT
49°
US WATERS
129°
128°
127°
126°
125°
124°

Fig. 6. STD stations occupied by the R/V G.B. REED, May 10-18, 1986.

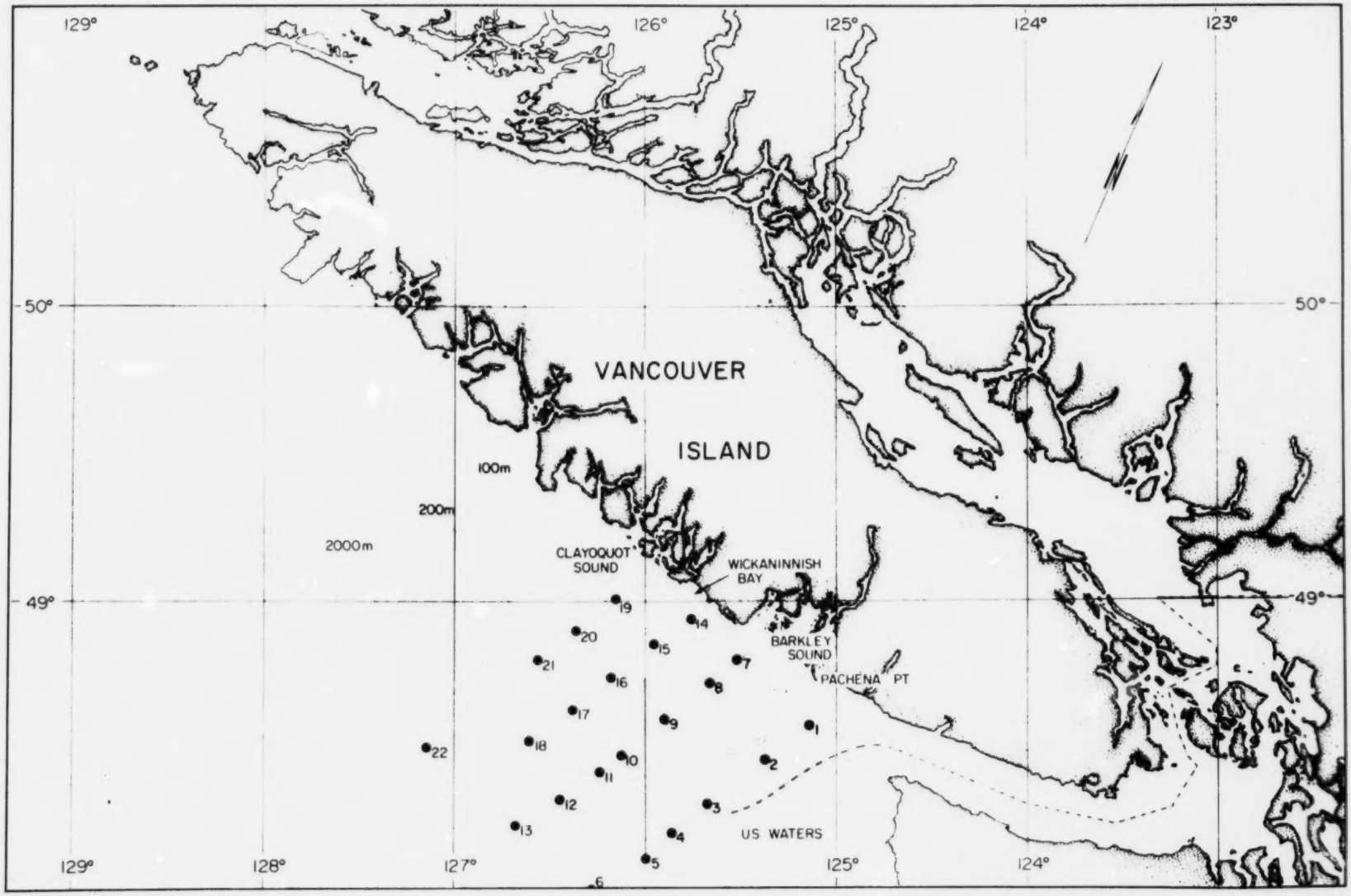

129°
126°
125°
124°
123°
50°
49°
VANCOUVER
ISLAND
100m
200m
2000m
CLAYOQUOT SOUND
WICKANINNISH BAY
BARKLEY SOUND
PACHENA PT
US WATERS
129°
128°
127°
125°
124°
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22

Fig. 7. Distribution and abundance (no. per 1000 m^3) of sablefish larvae in the surface waters using the neuston sampler. R/V G.B. REED, April 2-18, 1986.

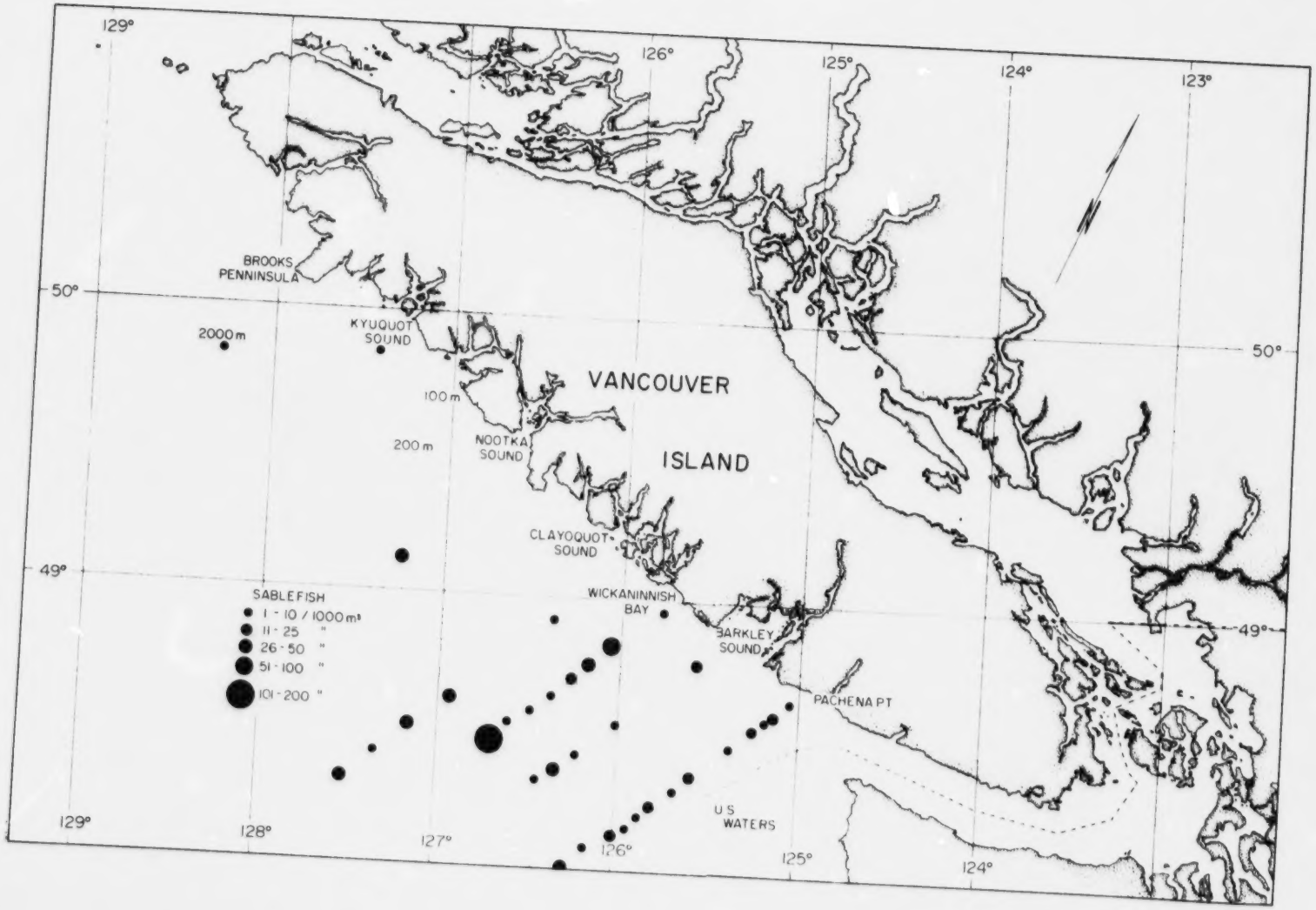

129°
126°
125°
124°
123°
50°
49°
BROOKS PENNINSULA
KYUQUOT SOUND
2000 m
100 m
200 m
NOOTKA SOUND
VANCOUVER ISLAND
CLAYOQUOT SOUND
WICKANINNISH BAY
BARKLEY SOUND
PACHENA PT
SABLEFISH
1 - 10 / 1000 m²
11 - 25 "
26 - 50 "
51 - 100 "
101 - 200 "
U.S. WATERS
129°
128°
127°
126°
125°
124°

Fig. 8. Distribution and abundance (no. per 1000 m^3) of sablefish larvae in the surface waters using the neuston sampler. R/V G.B. REED, May 10-18, 1986.

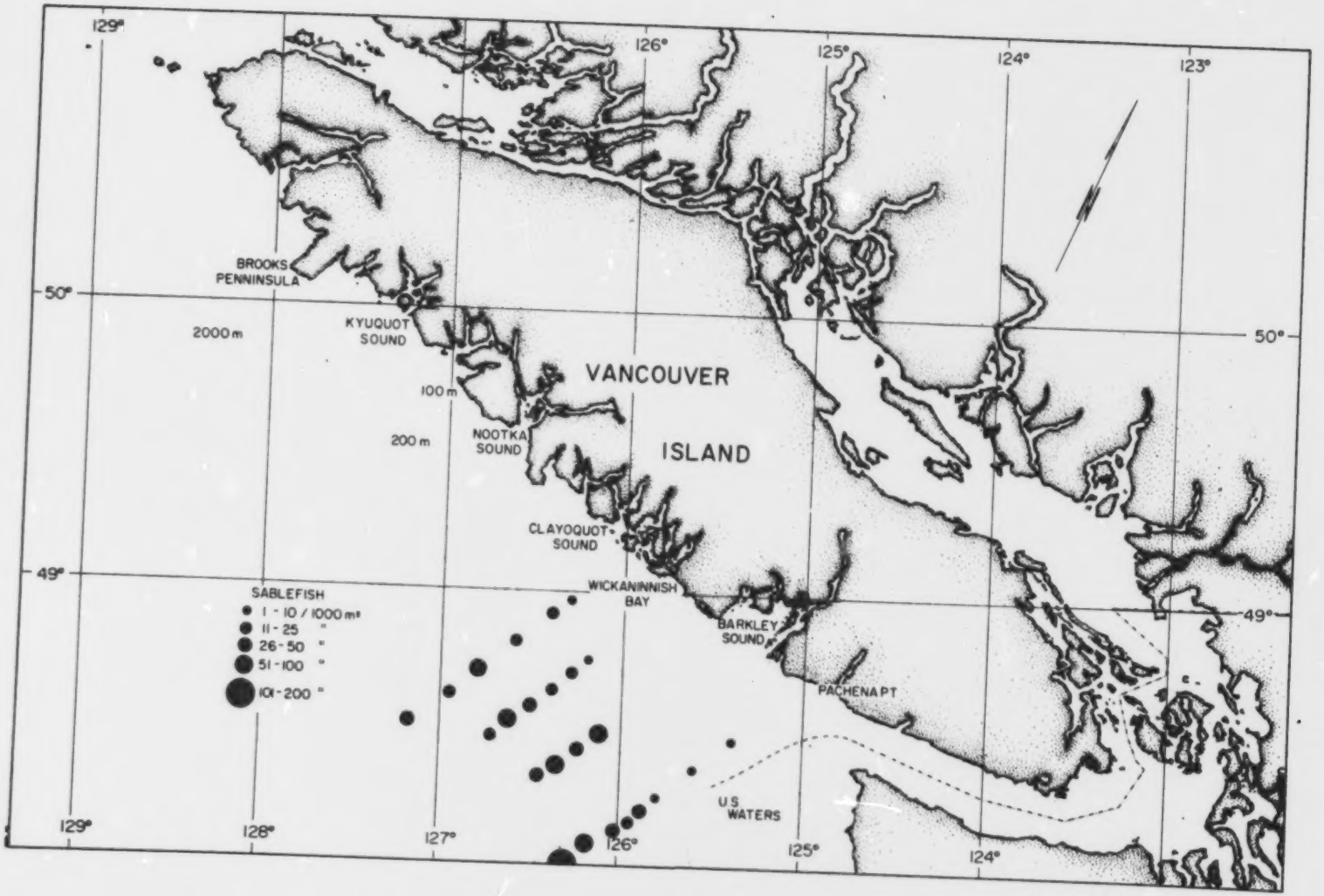

129°
126°
125°
124°
123°
50°
49°
BROOKS PENNINSULA
KYUQUOT SOUND
2000 m
100 m
200 m
NOOTKA SOUND
VANCOUVER
ISLAND
CLAYOQUOT SOUND
WICKANINNISH BAY
BARKLEY SOUND
PACHENA PT
U.S. WATERS
SABLEFISH
1 - 10 / 1000 m²
11 - 25 "
26 - 50 "
51 - 100 "
101 - 200 "
129°
128°
127°
126°
125°
124°

Fig. 9. Length frequency of sablefish larvae caught in the neuston tows off Vancouver Island during April and May, 1986.

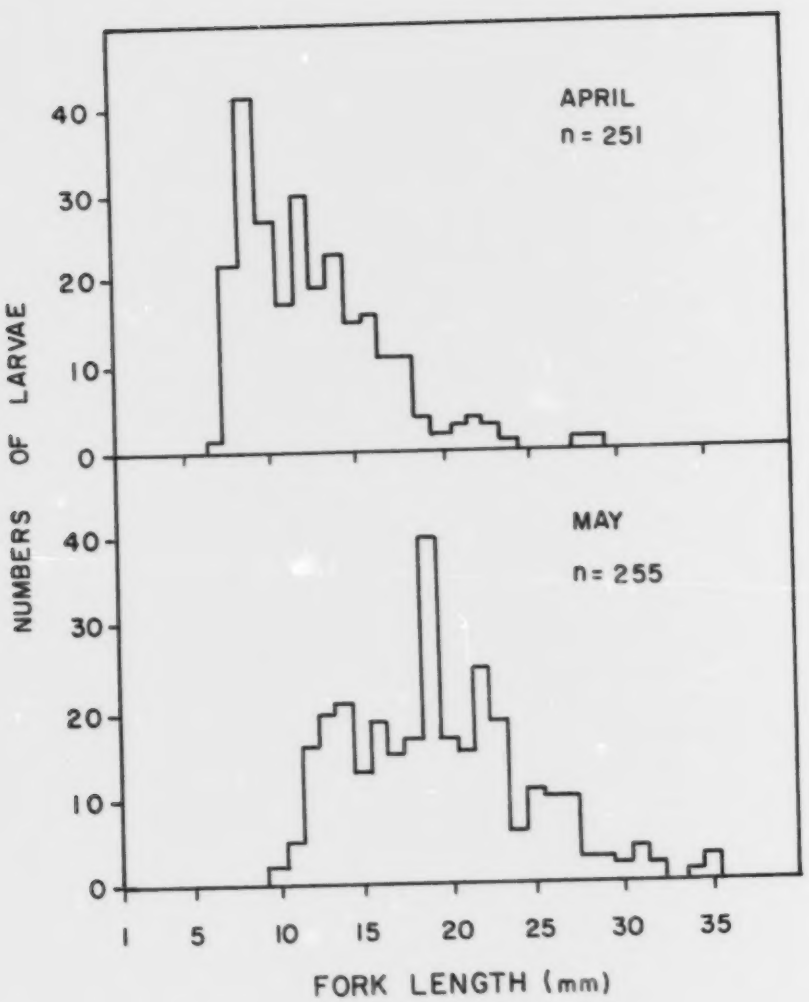

APRIL
n = 251
MAY
n = 255
NUMBERS OF LARVAE
0
10
20
30
40
1
5
10
15
20
25
30
35
FORK LENGTH (mm)

Fig. 10. Distribution and abundance (no. per 1000 m^3) of Pacific herring and lingcod larvae in the surface waters using the neuston sampler. R/V G.B. REED, April 2-18, 1986.

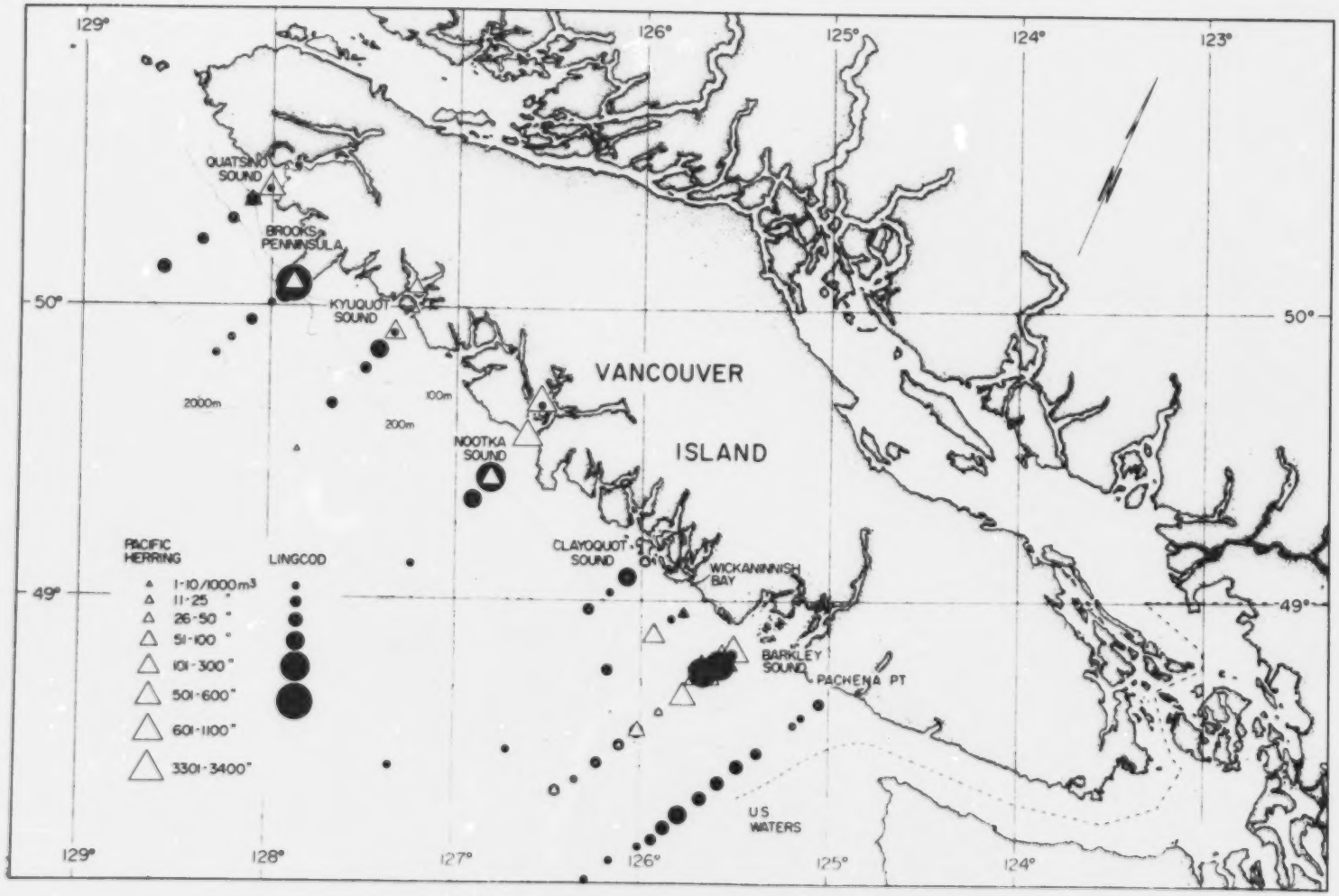

129°
126°
125°
124°
123°
50°
49°
128°
127°
QUATSINO SOUND
BROOKS PENINSULA
KYUQUOT SOUND
VANCOUVER ISLAND
NOOTKA SOUND
CLAYOQUOT SOUND
WICKANINNISH BAY
BARKLEY SOUND
PACHENA PT
US WATERS
2000m
200m
100m
PACIFIC HERRING
1-10/1000m3
11-25 "
26-50 "
51-100 "
101-300 "
501-600 "
601-1100 "
3301-3400 "
LINGCOD

Fig. 11. Distribution and abundance (no. per 1000 m^3) of Pacific herring and lingcod larvae in the surface waters using the neuston sampler. R/V G.B. REED, May 10-18, 1986.

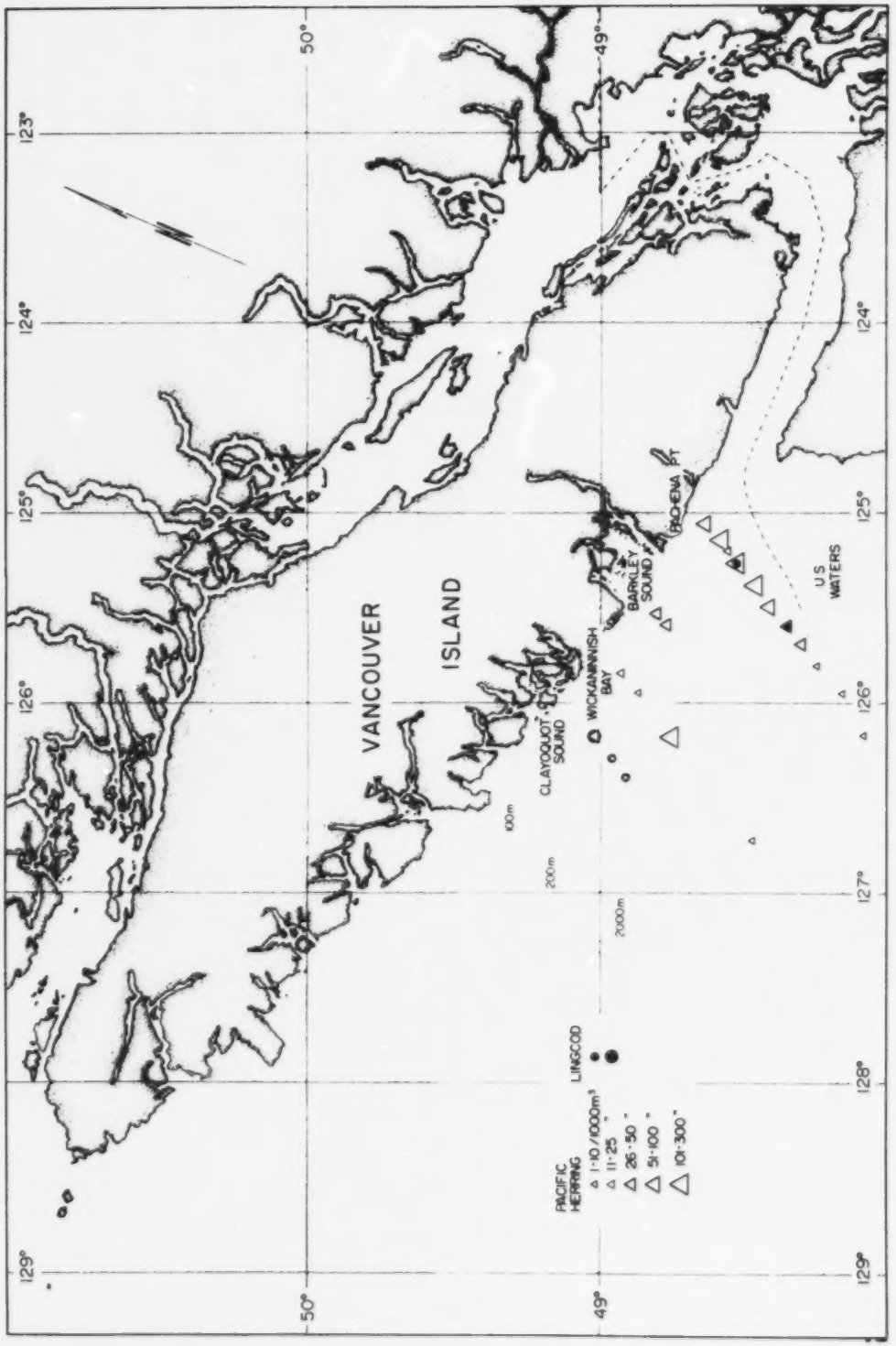

VANCOUVER
ISLAND
CLAYOQUOT SOUND
WICKANINNISH BAY
BARKLEY SOUND
PT. ALBERNI
US WATERS
100m
200m
2000m
PACIFIC HERRING
1-10 /1000m³
11-25 "
26-50 "
51-100 "
101-300 "
LINGCOD
123°
124°
125°
126°
127°
128°
129°
50°
49°

Fig. 12. Distribution and abundance (no. per 1000 m^3) of Pacific sand lance and rockfish larvae in the surface waters using the neuston sampler. R/V G.B. REED, April 2-18, 1986.

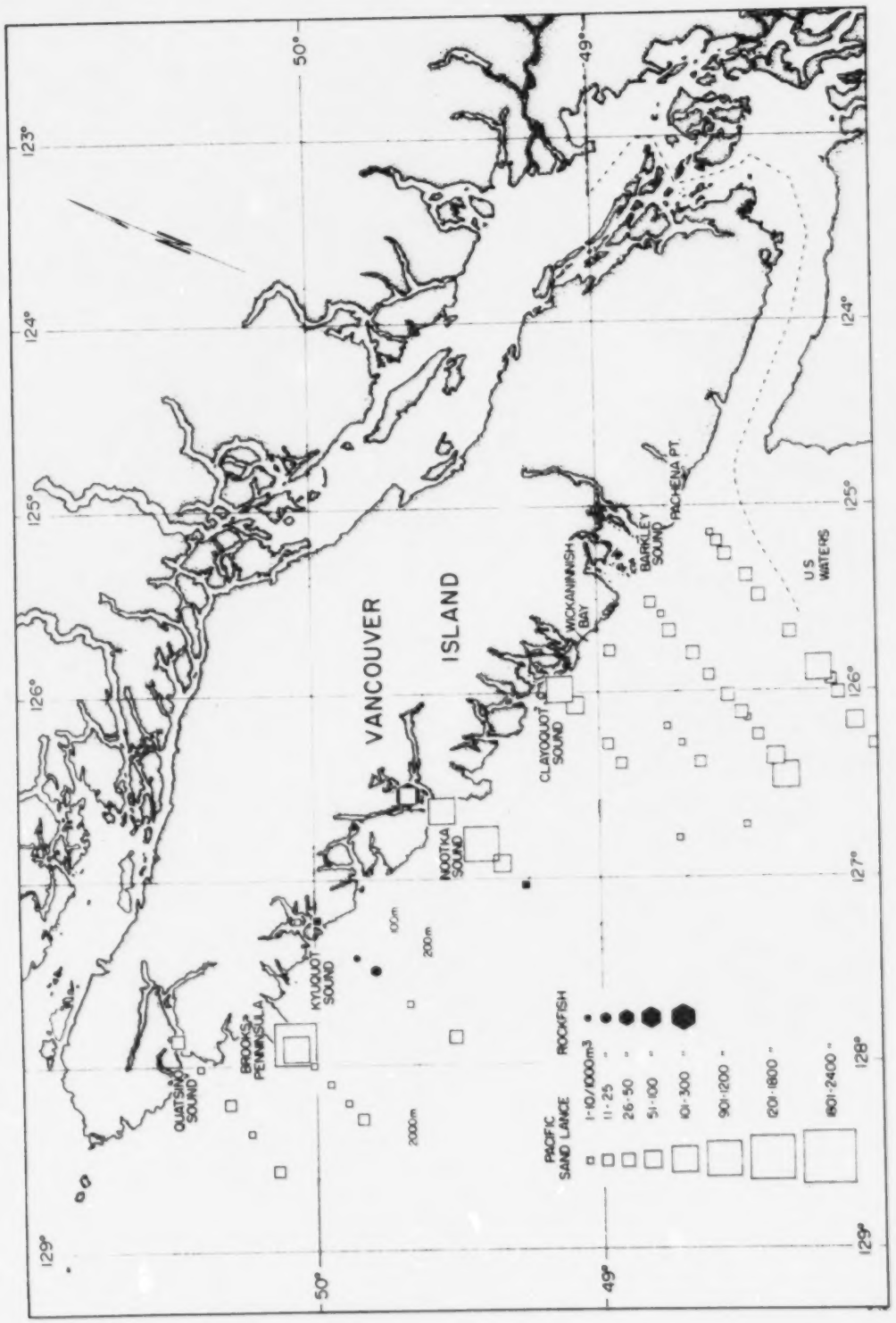

VANCOUVER
ISLAND
QUATSINO SOUND
BROOKS PENINSULA
KYUQUOT SOUND
NOOTKA SOUND
CLAYOQUOT SOUND
WICKANINNISH BAY
BARKLEY SOUND
PACHENA PT.
U.S. WATERS
100m
200m
2000m
PACIFIC SAND LANCE
ROCKFISH
1-10/1000m³
11-25 "
26-50 "
51-100 "
101-300 "
901-1200 "
1201-1800 "
1801-2400 "
123°
124°
125°
126°
127°
128°
129°
50°
49°

Fig. 13. Distribution and abundance (no. per 1000 m^3) of Pacific sand lance and rockfish larvae in the surface waters using the neuston sampler. R/V G.B. REED, May 10-18, 1986.

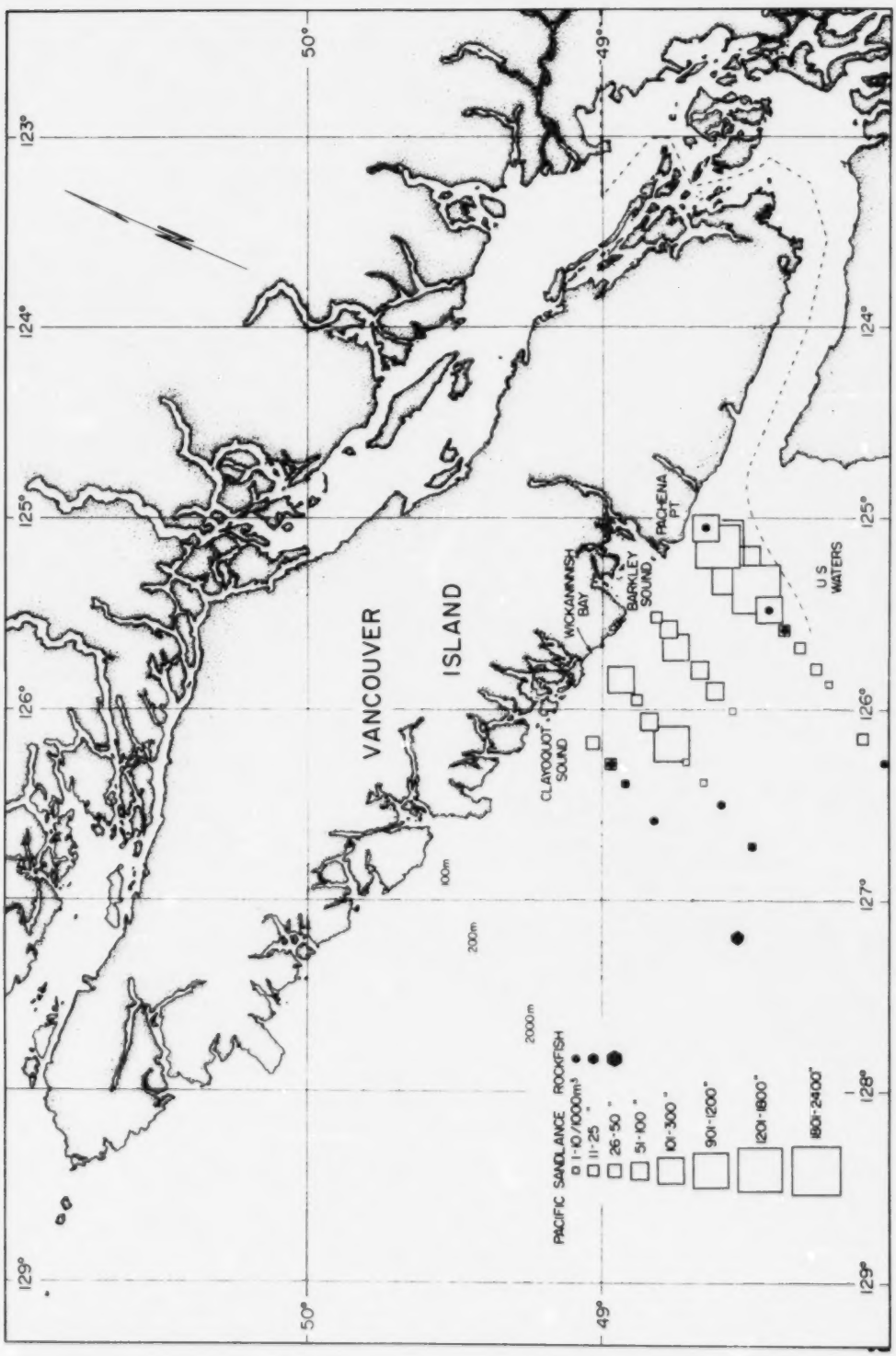

VANCOUVER
ISLAND
CLAYOQUOT SOUND
WICKANINNISH BAY
BARKLEY SOUND
PACHENA PT
U.S. WATERS
100m
200m
2000m
PACIFIC SANDLANCE ROCKFISH
1-10/1000m³
11-25
26-50
51-100
101-300
901-1200
1201-1800
1801-2400
123°
124°
125°
126°
127°
128°
129°
50°
49°

Fig. 14. Surface temperature (^{o}C) profiles off the lower west coast of Vancouver Island, April 2-18, 1986. (+ represents STD station.)

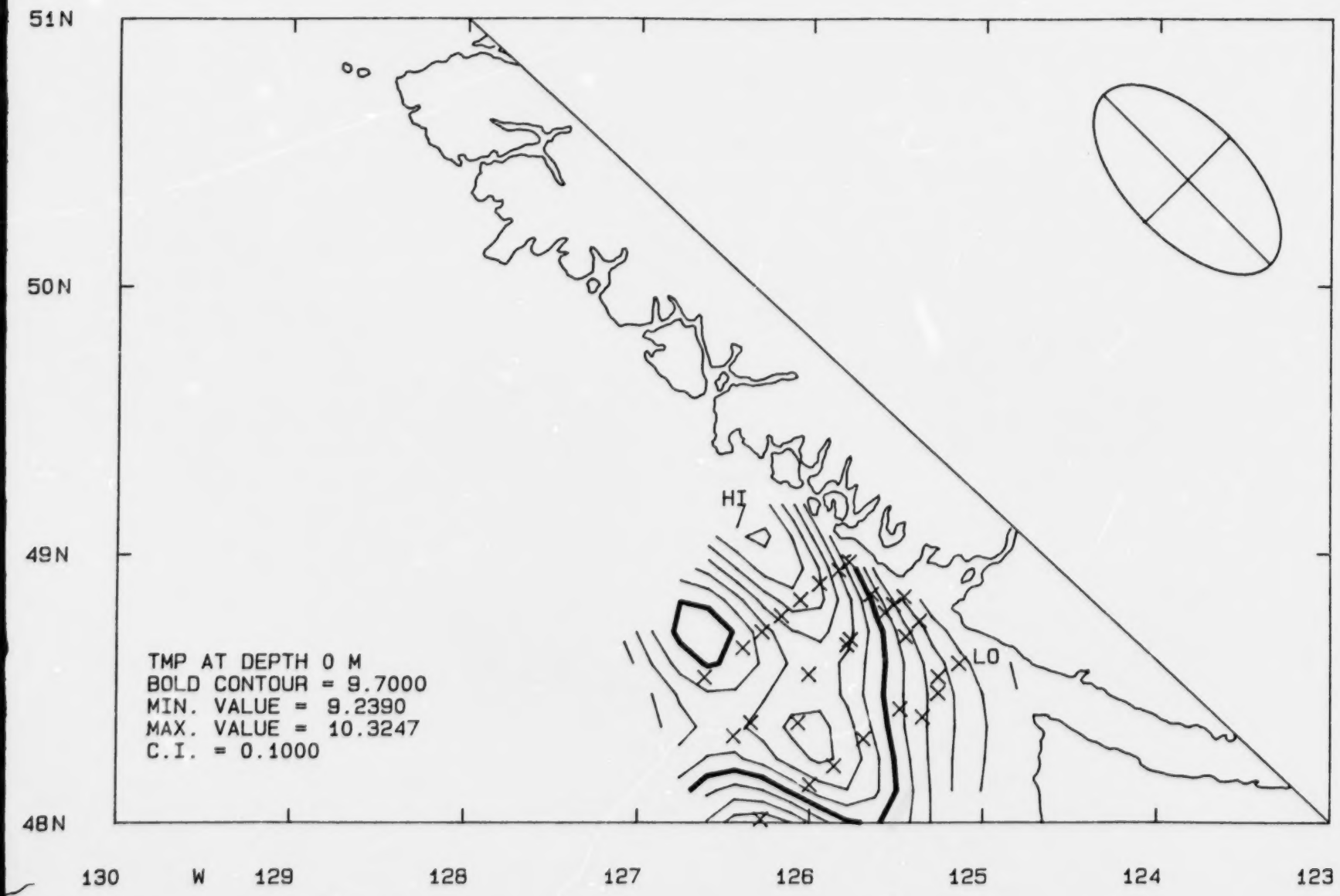

51N
50N
49N
48N
130
W
129
128
127
126
125
124
123
HI
LO
TMP AT DEPTH 0 M
BOLD CONTOUR = 9.7000
MIN. VALUE = 9.2390
MAX. VALUE = 10.3247
C.I. = 0.1000

Fig. 15. Surface salinity ($^{o}/_{oo}$) profiles off the lower west coast of Vancouver Island, April 2-18, 1986. (+ represents STD station.)

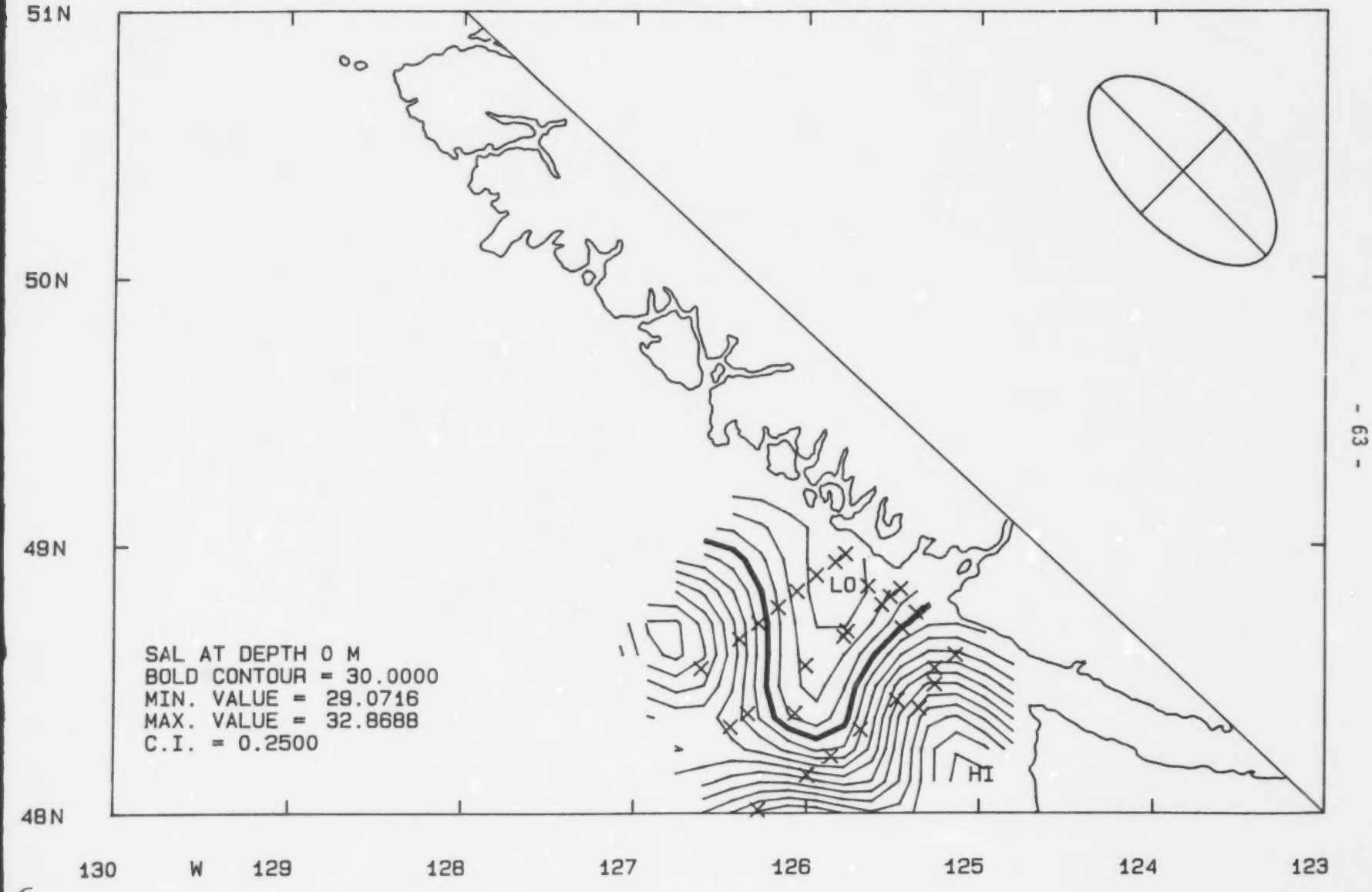

51N
50N
49N
48N
130
W
129
128
127
126
125
124
123
LO
HI
SAL AT DEPTH 0 M
BOLD CONTOUR = 30.0000
MIN. VALUE = 29.0716
MAX. VALUE = 32.8688
C.I. = 0.2500

Fig. 16. Surface density or sigma-t (σ) profiles off the lower west coast of Vancouver Island, April 2-18, 1986. (+ represents STD station.)

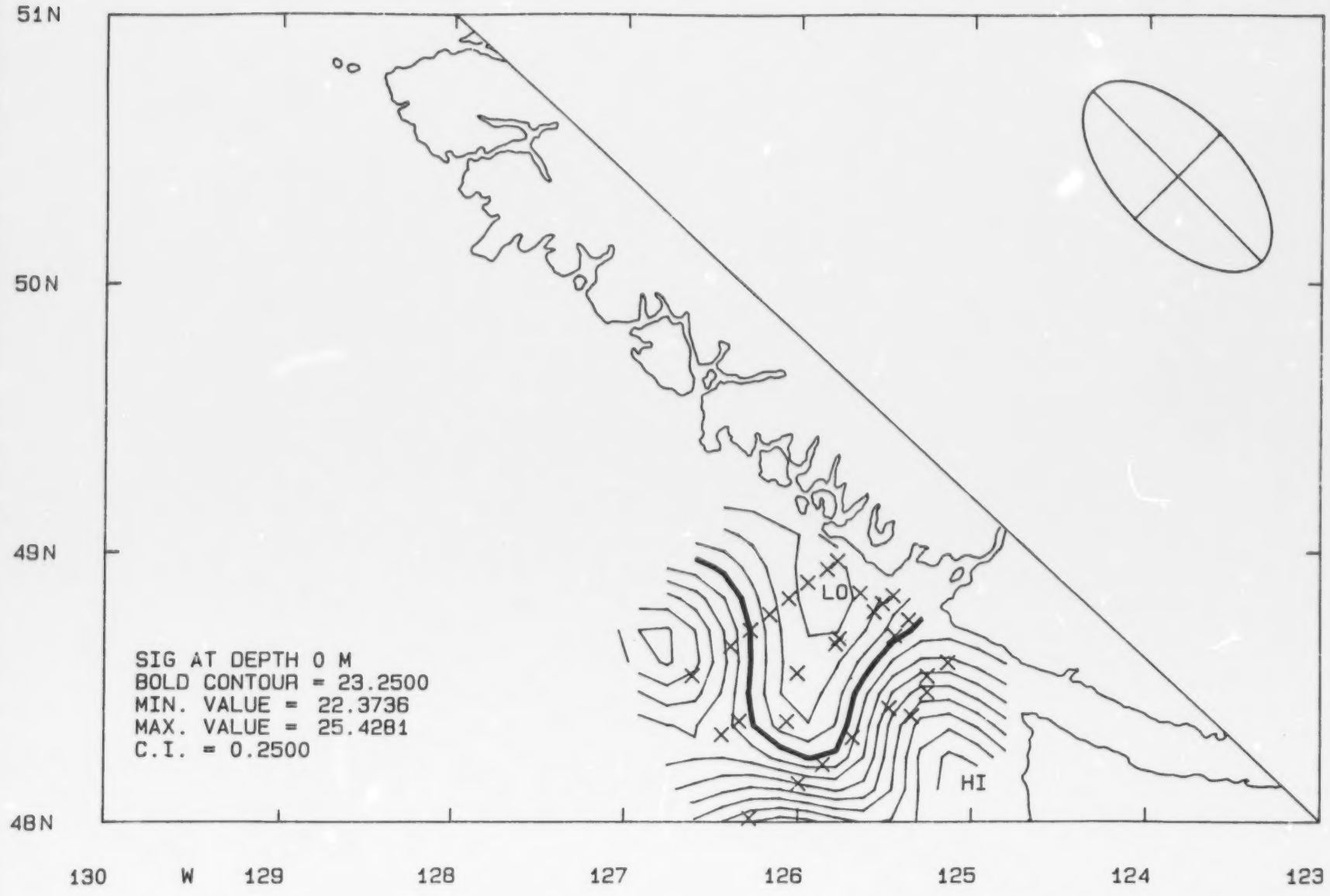

51N
50N
49N
48N
130
W
129
128
127
126
125
124
123
LO
HI
SIG AT DEPTH 0 M
BOLD CONTOUR = 23.2500
MIN. VALUE = 22.3736
MAX. VALUE = 25.4281
C.I. = 0.2500

Fig. 17. Surface current velocity (cm/sec) (relative to 100 m) off the lower west coast of Vancouver Island using the STD, April 2-18, 1986.

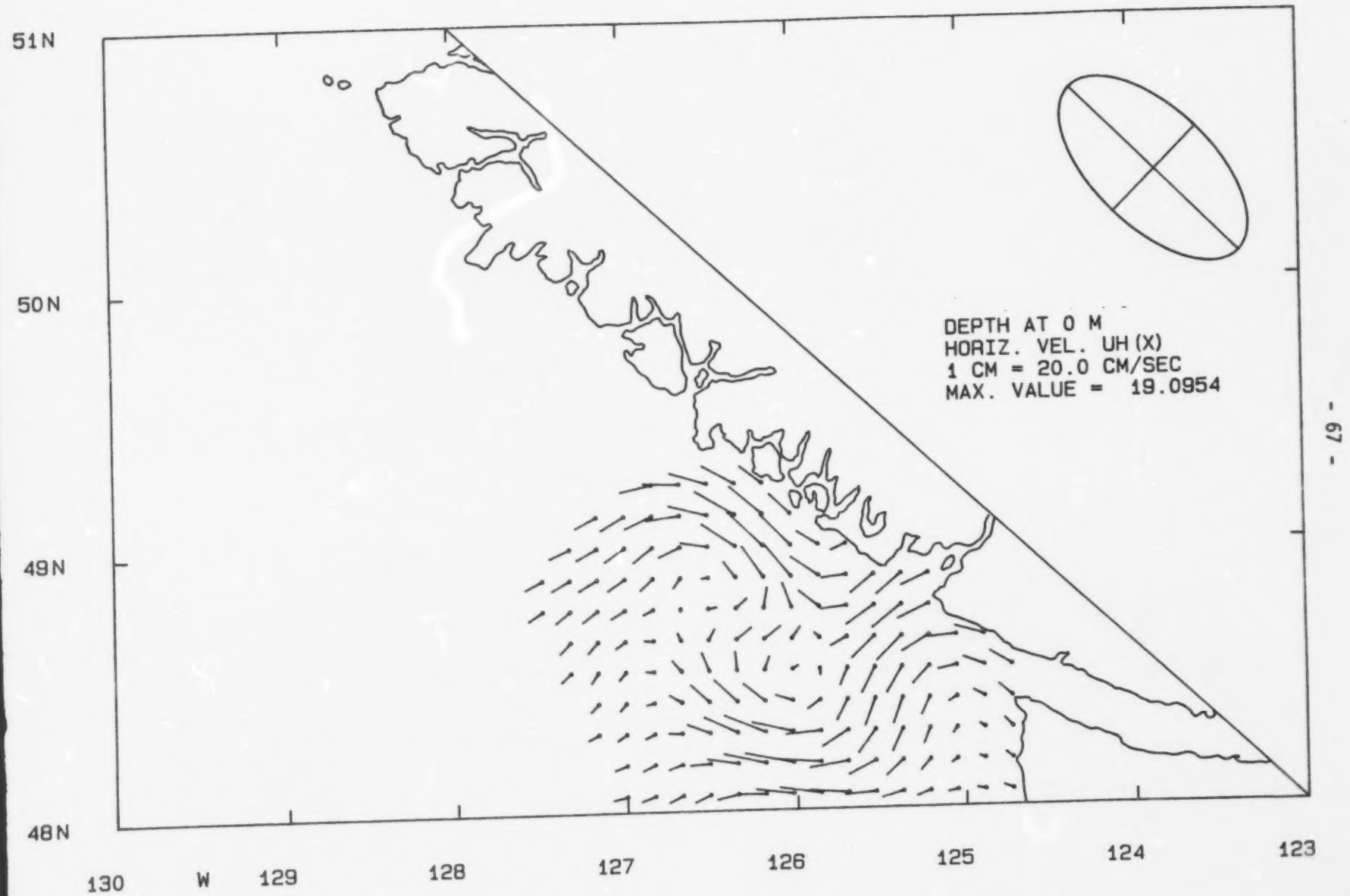

51N
50N
49N
48N
130
W
129
128
127
126
125
124
123
DEPTH AT 0 M
HORIZ. VEL. UH(X)
1 CM = 20.0 CM/SEC
MAX. VALUE = 19.0954

Fig. 18. Surface temperature (^{o}C) profiles off the lower west coast of Vancouver Island, May 10-18, 1987. (+ represents STD station.)

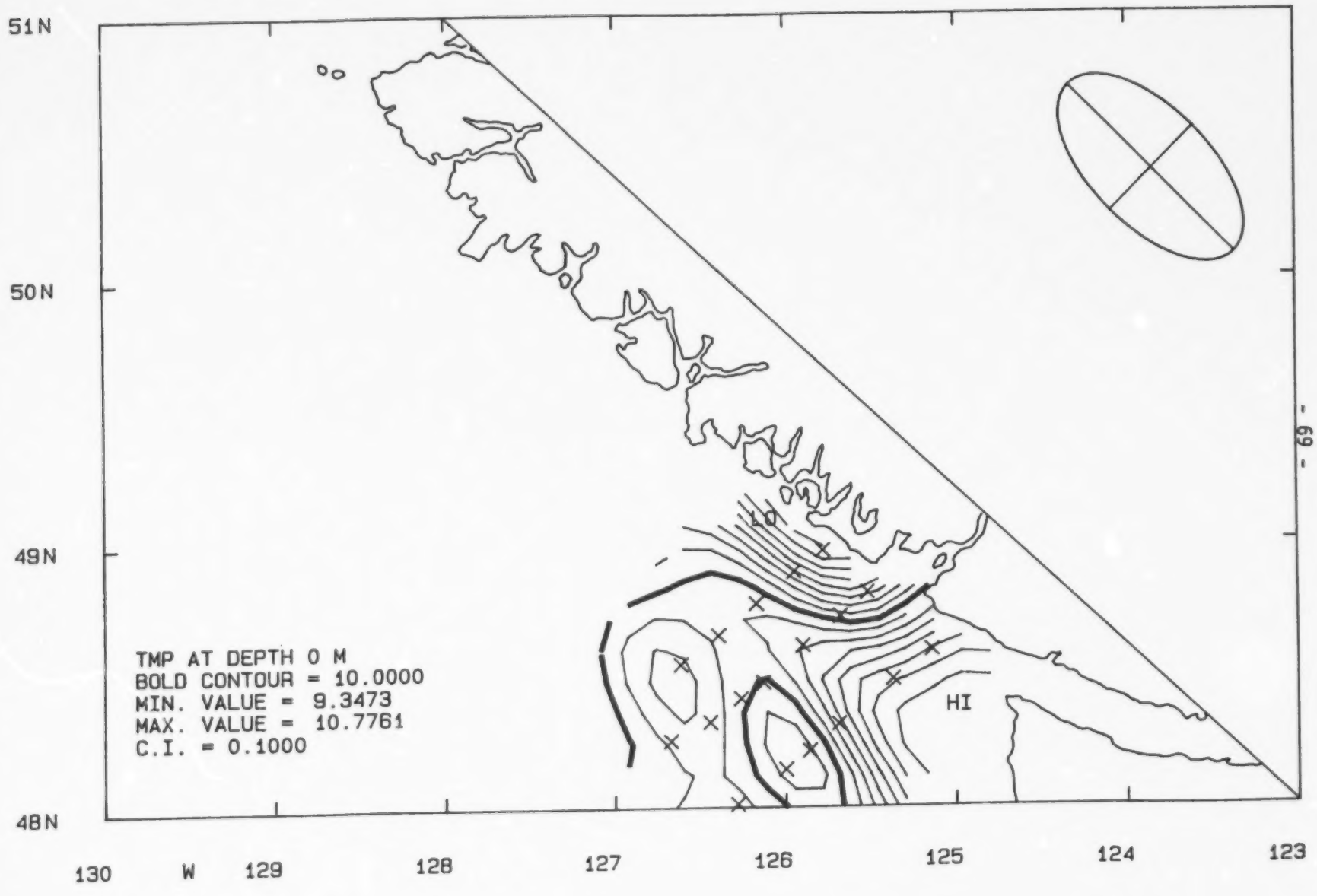

51N
50N
49N
48N
130
W
129
128
127
126
125
124
123
TMP AT DEPTH 0 M
BOLD CONTOUR = 10.0000
MIN. VALUE = 9.3473
MAX. VALUE = 10.7761
C.I. = 0.1000
HI

Fig. 19. Surface salinity ($^{o}/_{oo}$) profiles off the lower west coast of Vancouver Island, May 10-18, 1986. (+ represents STD station.)

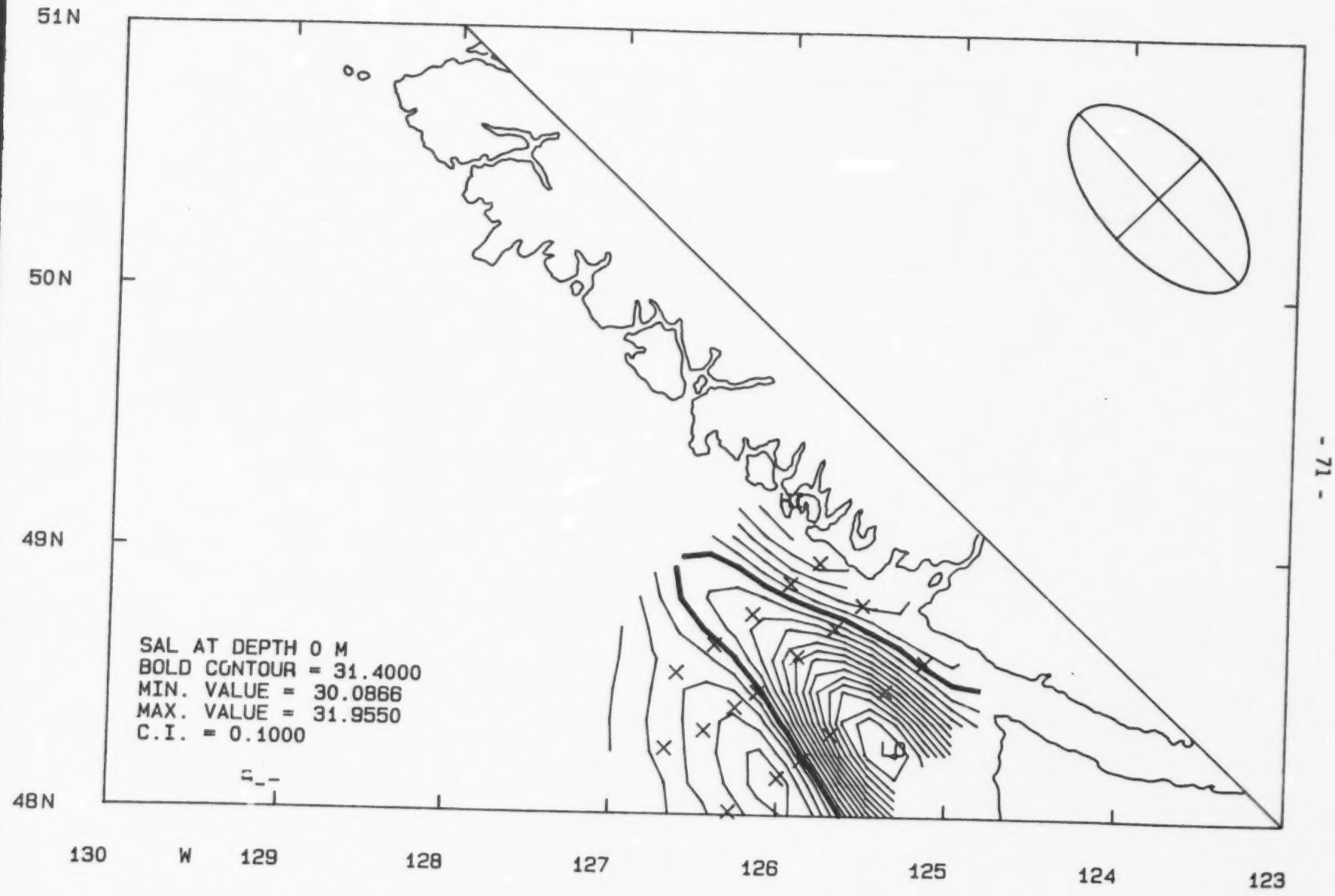

51N
50N
49N
48N
130
W
129
128
127
126
125
124
123
SAL AT DEPTH 0 M
BOLD CONTOUR = 31.4000
MIN. VALUE = 30.0866
MAX. VALUE = 31.9550
C.I. = 0.1000
LO

Fig. 20. Surface density or sigma-t (σ) profiles off the lower west coast of Vancouver Island, May 10-18, 1986. (+ represents STD station.)

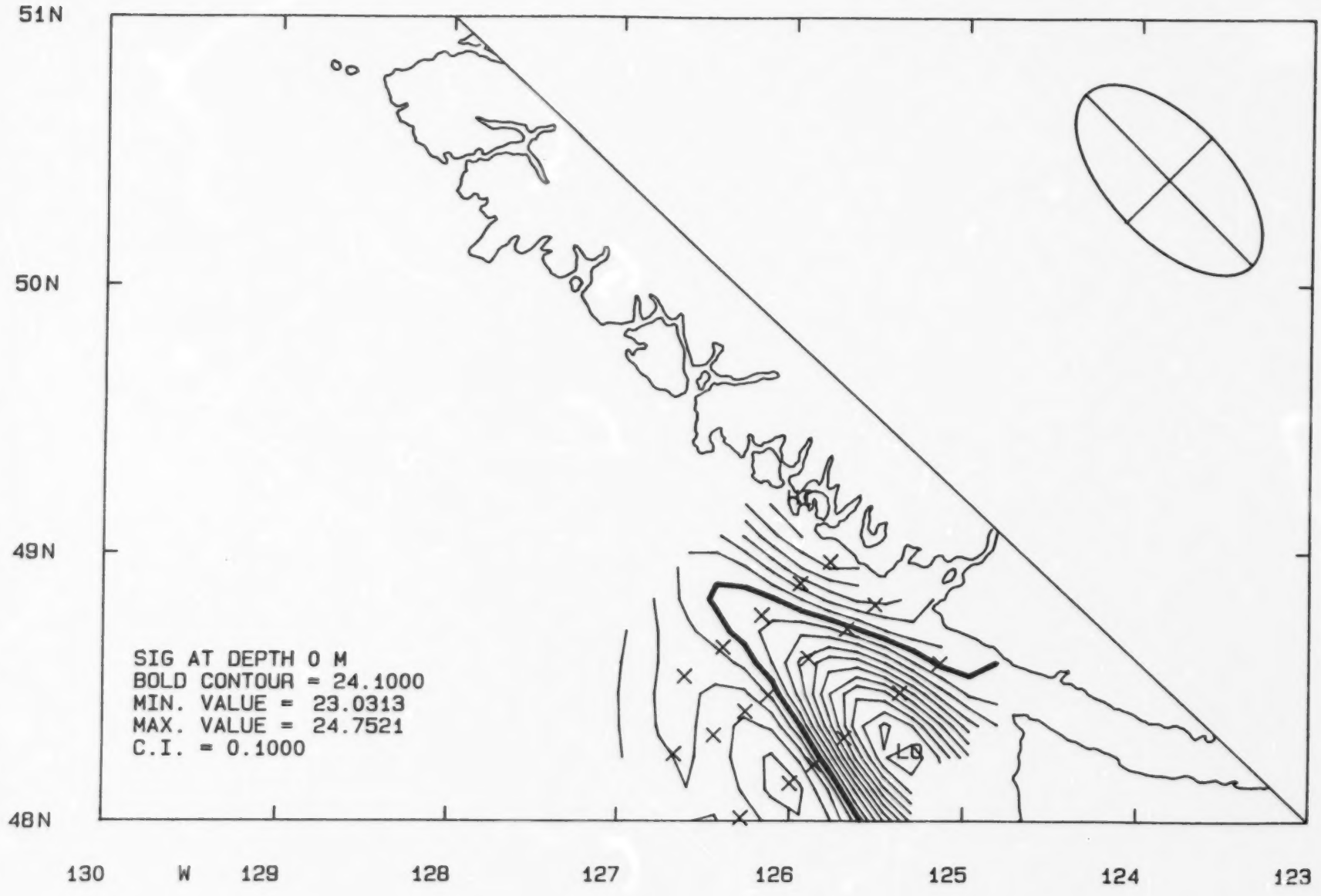
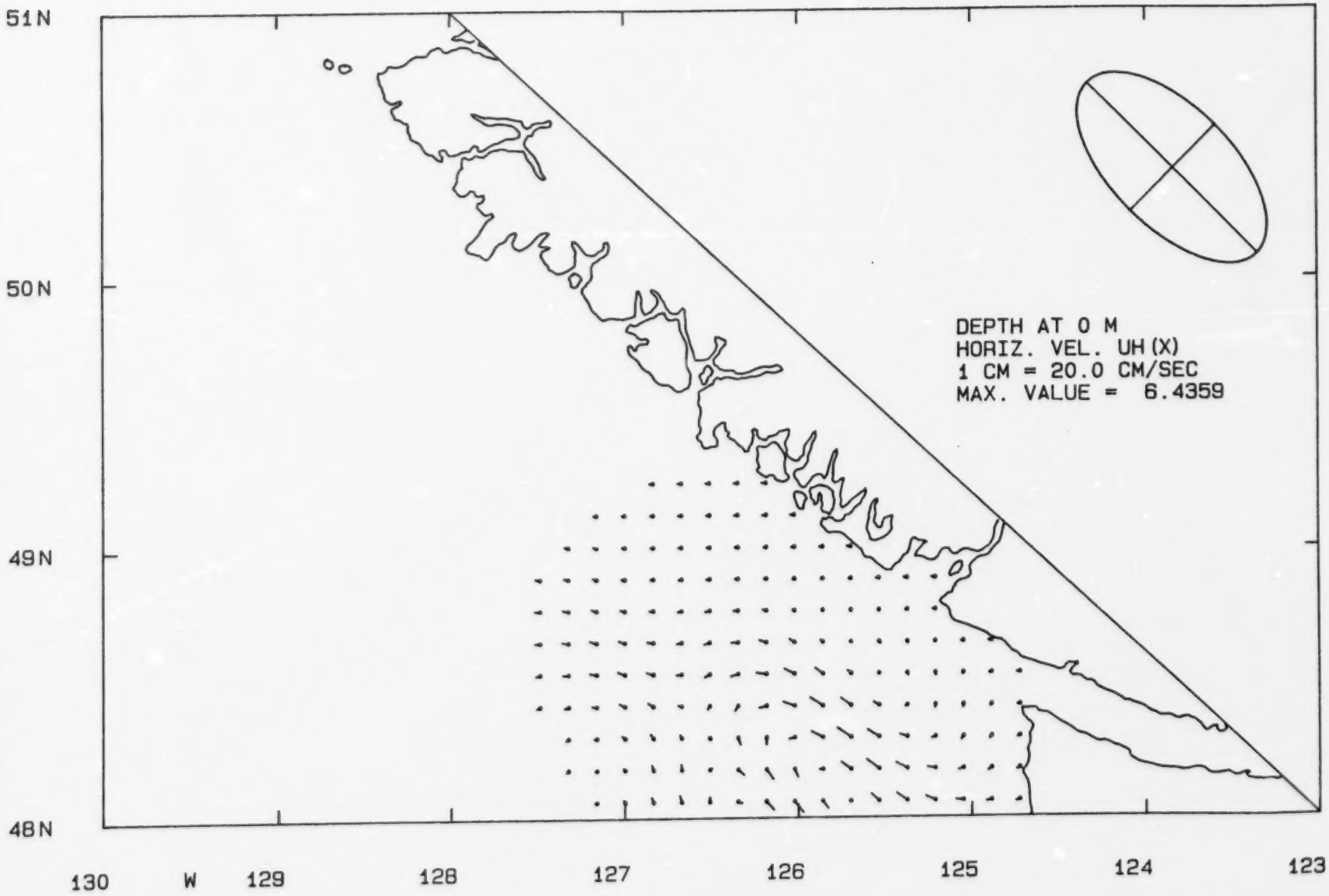

51N
50N
49N
48N
130
W
129
128
127
126
125
124
123
SIG AT DEPTH 0 M
BOLD CONTOUR = 24.1000
MIN. VALUE = 23.0313
MAX. VALUE = 24.7521
C.I. = 0.1000

Fig. 21. Surface current velocity (cm/sec) (relative to 100 m) off the lower west coast of Vancouver Island using the STD, May 10-18, 1986.


51N
50N
49N
48N
130
W
129
128
127
126
125
124
123
DEPTH AT 0 M
HORIZ. VEL. UH(X)
1 CM = 20.0 CM/SEC
MAX. VALUE = 6.4359

Appendix table 1. Set locations of the neuston plankton tows. R/V G.B. REED, April 2-18, 1986. (D indicates tows conducted during daylight hours)

Locality	Stn. no.	Date	Time	Latitude	Longitude	Bottom depth (m/fath)	Flow meter total
PACHENA POINT							
	1	Apr. 6	0459	48°39.00'N	125°02.40'W	55/30	31752
	2	Apr. 3	0905D	48°35.67'N	125°08.72'W	105/58	54121
		Apr. 6	0408				47313
	3	Apr. 6	0338	48°34.00'N	125°12.00'W	95/52	39976
	4	Apr. 6	0307	48°32.18'N	125°15.51'W	110/60	40366
	5	Apr. 3	1329D	48°28.66'N	125°22.10'W	152/83	37596
		Apr. 6	0218				36327
	6	Apr. 6	0127	48°25.30'N	125°28.65'W	145/89	31774
	7	Apr. 3	1515D	48°22.00'N	125°34.80'W	135/74	49718
		Apr. 6	0045				41158
	8	Apr. 5	2347	48°18.57'N	125°41.35'W	150/82	40264
	9	Apr. 3	1725D	48°15.20'N	125°47.75'W	200/109	45616
		Apr. 5	2258				41731
	10	Apr. 3	1916	48°12.92'N	125°51.90'W	510/279	57186
		Apr. 5	2217				60110
	11	Apr. 3	2156	48°10.60'N	125°56.12'W	810/443	64259
		Apr. 5	2140				57845
	12	Apr. 3	2241	48°08.48'N	126°00.00'W	1180/99	60746
		Apr. 5	2105				51762
	13	Apr. 3	2340	48°04.36'N	126°08.46'W	1450/793	62109
		Apr. 5	2007				58483
	14	Apr. 4	0040	48°00.53'N	126°17.00'W	1530/837	52748
		Apr. 5	1915				54203
BARKLEY SOUND							
	15	Apr. 7	0315	48°48.68'N	125°30.95'W	105/57	20647
			0330				45041
	16	Apr. 15	1930	48°46.95'N	125°34.24'W	130/71	52000
			1945				43556
	17	Apr. 7	0200	48°43.43'N	125°40.80'W	162/89	27629
			0220				29834
	18	Apr. 7	0103	48°39.94'N	125°47.40'W	90/49	27621
			0120				23162
		Apr. 15	2107				39634
			2120				34833
	19	Apr. 7	0010	48°36.46'N	125°54.00'W	95/52	31769
			0027				32065
	20	Apr. 4	1928	48°32.96'N	126°00.50'W	125/68	43379
		Apr. 6	2255				37895
			2300				36805
		Apr. 15	2237				40132
			2250				45871
	21	Apr. 6	2200	48°29.45'N	126°07.10'W	197/108	29174
			2215				42627

Appendix table 1 (cont'd)

Locality	Stn. no.	Date	Time	Latitude	Longitude	Bottom depth (m/fath)	Flow meter total
BARKLEY SOUND							
	22	Apr. 4	1813D	48°28.43'N	126°08.00'W	250/137	50983
	23	Apr. 6	2050	48°25.94'N	126°13.70'W	660/361	26102
			2105				36872
		Apr. 16	0004				25819
			0024				26832
	24	Apr. 4	1432D	48°24.70'N	126°15.80'W	900/492	43754
	25	Apr. 6	2012	48°22.40'N	126°20.20'W	1150/629	23291
			2030				36619
	26	Apr. 4	1120D	48°18.95'N	126°26.70'W	1470/804	62662
		Apr. 6	1915				35490
			1930				33318
		Apr. 16	0143				34429
			0154				26372
WICKANINNISH BAY							
	27	Apr. 8	0320	48°58.35'N	125°47.05'W	42/23	24003
			0335				31991
	28	Apr. 8	0234	48°56.61'N	125°50.40'W	43/23	29885
			0257				21983
	29	Apr. 8	0147	48°53.16'N	125°57.00'W	60/33	21945
			0204				21755
	30	Apr. 8	0055	48°49.65'N	126°03.60'W	85/47	28331
			0113				22973
	31	Apr. 8	0003	48°46.18'N	126°10.20'W	135/74	28999
			0018				26327
	32	Apr. 7	2300	48°42.67'N	126°16.80'W	475/260	38481
			2315				38819
	33	Apr. 7	2200	48°39.17'N	126°23.40'W	760/415	42011
			2215				40613
	34	Apr. 7	2104	48°35.64'N	126°30.00'W	1095/699	39968
			2120				36289
	35	Apr. 7	2014	48°32.30'N	126°36.60'W	1475/807	37448
			2027				43428
	36	Apr. 7	1915	48°28.76'N	126°42.94'W	1560/853	37848
			1930				38878
CLAYOQUOT SOUND							
	37	Apr. 15	0507	49°08.00'N	125°59.00'W	27/15	54648
	38	Apr. 15	0445	49°05.1'N	126°04.5'W	35/29	52510
	39	Apr. 15	0415	48°02.00'N	126°10.39'W	73/40	52181
	40	Apr. 15	0325	48°58.6'N	126°16.7'W	123/67	52260
	41	Apr. 15	0300	48°55.60'N	126°22.90'W	154/84	59947
	42	Apr. 15	0102	48°49 20'N	126°34.90'W	362/198	45604
	43	Apr. 14	2350	48°43.10'N	126°46.5'W	1304/713	43472
	44	Apr. 14	2240	48°37.6'N	126°57.3'W	2012/1100	56373
	45	Apr. 14	2120	48°31.20'N	127°09.30'W	2560/1400	52800

Appendix table 1 (cont'd)

Locality	Stn. no.	Date	Time	Latitude	Longitude	Bottom depth (m/fath)	Flow meter total
CLAYOQUOT SOUND							
	46	Apr. 14	2016				56313
	47	Apr. 14	1900	48°19.0'N	127°32.0'W	2615/1430	55875
NOOTKA SOUND							
	48	Apr. 12	1935	49°40.9'N	126°33.4'W	160/88	35000
	49	Apr. 12	2018	49°33.5'N	126°38.0'W	70/38	36717
			2032				45161
	50	Apr. 13	1922	49°25.5'N	126°49.0'W	93/51	35979
			1927				37069
	51	Apr. 13	2032	49°21.0'N	126°55.0'W	148/81	34998
	52	Apr. 13	2132	49°16.0'N	127°01.5'W	172/94	36142
	53	Apr. 13	2220	49°13.5'N	127°05.0'W	433/237	30098
	54	Apr. 13	2330	49°07.0'N	127°13.8'W	1592/876	43521
KYUQUOT SOUND							
	55	Apr. 10	1300D	50°03.6'N	127°13.8'W	210/115	28779
			2012				40319
	56	Apr. 10	1412D	49°59.1'N	127°14.2'W	160/88	29602
			1922				38722
	57	Apr. 10	2056	49°55.0'N	127°21.0'W	59/32	34382
			2112				26785
	58	Apr. 10	2145	49°51.5'N	127°25.0'W	73/40	40486
			2200				39319
	59	Apr. 10	2245	49°47.2'N	127°29.0'W	90/49	44927
			2300				43527
	60	Apr. 11	0004	49°40.1'N	127°40.3'W	585/321	29972
			0015				31948
	61	Apr. 11	0135	49°30.5'N	127°51.0'W	2012/1094	25354
			0150				31540
BROOKS PENINSULA							
	62	Apr. 9	2005	50°04.37'N	127°53.38'W	72/39	32680
			2020				39252
	63	APr. 9	2030	50°03.4'N	127°55.1'W	145/79	38625
			2050				43090
	64	Apr. 9	2115	50°00.60'N	128°00.0'W	1282/701	36861
			2135				40166
	65	Apr. 9	2210	49°57.0'N	128°06.2'W	650/355	32459
			2225				33712
	66	Apr. 9	2305	49°53.66'N	128°12.10'W	1929/1054	40745
			2315				39310
	67	Apr. 9	2355	49°50.31'N	128°17.82'W	2100/1148	21204
		Apr. 10	0010				35656

Appendix table 1 (cont'd)

Locality	Stn. no.	Date	Time	Latitude	Longitude	Bottom depth (m/fath)	Flow meter total
QUATSINO SOUND							
	68	Apr. 8	1936	50°28.2'N	127°56.2'W	210/115	52411
	69	Apr. 8	2007	50°28.8'N	127°52.4'W	180/98	53525
	70	Apr. 8	2104	50°24.0'N	128°02.0'W	104/57	35020
			2121				36211
	71	Apr. 8	2145	50°21.5'N	128°06.7'W	95/52	27532
			2201				21067
	72	Apr. 8	2240	50°17.9'N	128°12.9'W	194/106	38391
			2255				38832
	73	Apr. 8	2355	50°13.1'N	128°22.7'W	1061/580	42290
		Apr. 9	0010				24100
	74	Apr. 9	0135	50°07.5'N	128°35.0'W	1810/990	28285
			0200				27788

Appendix table 2. Set locations of the neuston plankton tows. R/V G.B. REED, May 10-18, 1986. (D indicates tows conducted during daylight hours)

Locality	Stn. no.	Date	Time	Latitude	Longitude	Bottom depth (m/fath)	Flow meter total
PACHENA POINT							
	1	May 11	0050	48°39.00'N	125°02.40'W	55/30	26230
			0106				30701
	2	May 11	0145	48°35.67'N	125°08.72'W	105/58	38300
			0200				34791
		May 15	1424D				39798
	3	May 11	0226	48°34.00'N	125°12.00'W	95/52	36966
			0243				30118
	4	May 11	0303	48°32.18'N	125°15.51'W	110/60	41415
			0321				33773
	5	May 11	0405	48°28.66'N	125°22.10'W	152/83	46204
			0420				51129
		May 15	1610D				44323
	6	May 11	0457	48°25.30'N	125°28.65'W	145/89	45835
			2115				40906
	7	May 11	1804D	48°22.00'N	125°34.80'W	135/74	51599
			2153				33176
			2208				36762
	8	May 11	2245	48°18.57'N	125°41.35'W	150/82	14356
			2300				18584
	9	May 11	1649D	48°15.20'N	125°47.75'W	200/109	37944
			2345				16905
		May 12	0005				26883
	10	May 12	0044	48°12.92'N	125°51.90'W	510/270	32033
			0052				33841
	11	May 11	1605D	48°10.60'N	125°56.12'W	810/443	47615
		May 12	0122				35127
			0135				33706
	12	May 12	0204	48°08.48'N	126°00.00'W	1180/650	36680
			0220				35581
	13	May 11	1452D	48°04.36'N	126°08.46'W	1450/793	42139
		May 12	0306				27220
			0319				36534
	14	May 12	0408	48°00.53'N	126°17.00'W	1530/837	43929
			0423				53490
BARKLEY SOUND							
	15	May 15	2126	48°48.68'N	125°30.95'W	105/57	29717
	16	May 15	1055D	48°46.95'N	125°34.24'W	130/71	28569
			2157				31137
	17	May 15	2242	48°43.43'N	125°40.80'W	162/89	28246
	18	May 15	0917D	48°39.94'N	125°47.40'W	90/49	35339
			2329				31809
	19	May 16	0013	48°36.46'N	125°54.00'W	95/52	40690
	20	May 15	0800D	48°32.96'N	126°00.50'W	125/68	32337
		May 16	0054				36578

Appendix table 2 (cont'd)

Locality	Stn. no.	Date	Time	Latitude	Longitude	Bottom depth (m/fath)	Flow meter total
BARKLEY SOUND							
	21	May 16	0135	48°29.45'N	126°07.10'W	197/108	33964
	22	May 16	0217	48°25.94'N	126°13.70'W	660/361	33243
	23	May 16	0258	48°22.40'N	126°20.20'W	1150/629	38016
	24	May 16	0337	48°18.94'N	126°26.70'W	1470/804	36571
WICKANINNISH BAY							
	25	May 15	0436	48°58 35'N	125°47.05'W	42/23	44271
	26	May 14	1006D	48°56'61'N	125°50.40'W	43/23	27133
		May 15	0356				36823
	27	May 15	0315	48°53.16'N	125°57.00'W	60/33	33424
	28	May 14	1135D	48°49.65'N	126°03.60'W	85/47	25390
		May 15	0234				41063
	29	May 15	0152	48°46.18'N	126°10.20'W	135/74	36710
	30	May 14	1316D	48°42.67'N	126°16.80'W	475/260	33117
		May 15	0109				40614
	31	May 15	0017	48°39.17'N	126°23.40'W	760/415	37774
			0031				35325
	32	May 14	1506D	48°35.64'N	126°30.00'W	1095/699	33826
			2317				36322
			2332				38178
	33	May 14	2215	48°32.20'N	126°36.60'W	1475/807	39599
			2226				36879
	34	May 14	1700D	48°28.76'N	126°42.94'W	1560/853	37437
			2111				31239
			2125				23849
CLAYOQUOT SOUND							
	35	May 16	2045	49°05.1'N	126°04.5'W	35/29	30725
	36	May 16	1750D	49°02.00'N	126°10.30'W	73/40	47673
			2141				40071
	37	May 16	2237	48°58.6'N	126°16.7'W	123/67	33171
	38	May 16	1515D	48°55.60'N	126°22.90'W	154/84	33555
			2337				43496
	39	May 16	1349D	48°49.20'N	126°34.90'W	362/198	43469
		May 17	0105				28706
	40	May 17	0221	48°43.10'N	126°46.5'W	1304/713	35652
	41	May 17	0333	48°37.6'N	126°57.3'W	2021/1100	34324
	42	May 16	0635D	48°31.20'N	127°09.30'W	2560/1400	50557
		May 17	0445				42876

Appendix table 3. Set locations of the bongo tows and vertical plankton hauls. R/V G.B. REED, April 2-18, 1986. All vertical haul stations are identified with the term vertical in parenthesis.

Locality	Stn. no.	Net[a] type	Date	Time	Latitude	Longitude	Net/bottom depth (m)	Flow-meter total
PACHENA POINT								
	1	1	Apr. 3	0845	48°35.67'N	125°08.72'W	105/118	10583
		2						10932
	2	1	Apr. 3	1304	48°28.66'N	125°22.10'W	150/152	13479
		2						13638
	3	1	Apr. 3	1450	48°22.00'N	125°34.80'W	145/148	14323
		2						14087
	4	1	Apr. 3	1656	48°15.20'N	125°47.74'W	210/217	18536
		2						17980
	5	1	Apr. 3	1805	48°12.92'N	125°51.90'W	200/515	16953
		2						16517
		1	Apr. 3	1827			200-500/515	29086
		2						28455
	6	1	Apr. 3	1958	48°10.60'N	125°56.12'W	200/897	14971
		2						14586
		1	Apr. 3	2020			200-500/897	31446
		2						30940
		1	Apr. 3	2107			500-700/897	37667
		2						36376
(vertical)	7	1	Apr. 3	1020	48°29.00'N	125°15.30'W	143/150	-
(vertical)	8	1	Apr. 3	1205	48°23.45'N	125°20.80'W	120/123	-
BARKLEY SOUND								
	9	1	Apr. 4	2215	48°43.43'N	125°40.80'W	150/155	13370
		2						13163
(vertical)	10	1	Apr. 4	2018	48°36.46'N	125°54.00'W	75/90	-
	11	1	Apr. 4	1921	48°32.96'N	126°00.56'W	100/130	8159
		2						7964
	12	1	Apr. 4	1800	48°28.43'N	126°08.00'W	200/250	22354
		2						21748
(vertical)	12	1	Apr. 4	1700			200/250	-
(vertical)	13	1	Apr. 4	1550	48°22.42'N	126°04.12'W	200/440	-
	14	1	Apr. 4	1432	48°24.70'N	126°15.80'W	200/896	24986
		2						24054
		1	Apr. 4	1305			200-500/896	40245
		2						40038
(vertical)	14	1	Apr. 4	1340			200/896	-
(vertical)	14	1	Apr. 4	1405			700/896	-
	15	1	Apr. 4	0935	48°18.95'N	126°26.70'W	200/1470	15010
		2						14465
		1	Apr. 4	1000			200-500/1470	37199
		2						35972
		1	Apr. 4	1035			500-700/1470	38594
		2						38104

Appendix table 3 (cont'd)

Locality	Stn. no.	Net[a] type	Date	Time	Latitude	Longitude	Net/bottom depth (m)	Flow-meter total
BARKLEY SOUND								
(vertical)	16	1	Apr. 4	0715	48°15.00'N	126°40.00'W	200/2400	-
(vertical)	16	1	Apr. 4	0730			700/2400	-
(vertical)	17	1	Apr. 5	0050	48°44.94'N	125°22.00'W	90/90	-
(vertical)	18	1	Apr. 4	2324	48°51.08'N	125°39.20'W	40/44	-
(vertical)	19	1	Apr. 5	0150	48°41.15'N	125°27.05'W	120/130	-
(vertical)	20	1	Apr. 4	2114	48°40.60'N	125°46.25'W	90/106	-
NOOTKA SOUND								
	21	1	Apr. 11	0830	49°16.00'N	127°01.50'W	110/166	13920
		2						13583
	22	1	Apr. 11	0950	49°07.00'N	127°13.80'W	200/1100	15865
		2						15206
		1	Apr. 11	1014			200-500/1100	30352
		2						29645
		1	Apr. 11	1046			500-700/1100	34375
		2						33575
KYUQUOT SOUND								
	23	1	Apr. 10	1230	50°03.60'N	127°13.80'W	150/210	16772
		2						15717
	24	1	Apr. 10	1345	49°59.10'N	127°14.21'W	200/160	15713
		2						20521

[a]Net type 1=230 µm nitex mesh

2=350 µm nitex mesh

Appendix table 4. Set locations of the bongo tows and vertical plankton hauls. R/V G.B. REED, May 10-18, 1986. All vertical haul stations are identified with the term vertical in parenthesis.

Locality	Stn. no.	Net[a] type	Date	Time	Latitude	Longitude	Net/bottom depth (m)	Flow-meter total
PACHENA POINT								
	1	1	May 15	1408	48°35.67'N	125°08.72'W	107/108	8847
		2						8484
	2	1	May 11	0620	48°22.00'N	125°34.80'W	148/150	15758
		2						15447
	3	1	May 11	0855	48°15.20'N	125°47.75'W	200/206	17615
		2						16741
	4	1	May 11	1020	48°10.60'N	125°56.12'W	200/950	17967
		2						17807
		1	May 11	1045			200-500/950	35519
		2						34353
		1	May 11	1130			500-700/950	37528
		2						36483
BARKLEY SOUND								
	5	1	May 12	1000	48°18.95'N	126°26.70'W	200/1470	19148
		2						18166
		1	May 12	1030			200-500/1470	34836
		2						33584
(vertical)	6	1	May 12	0805	48°15.00'N	126°40.00'W	200/2400	-
WICKANINNISH BAY								
	7	1	May 15	1010	48°53.16'N	125°57.00'W	66/66	16576
		2						16371
	8	1	May 15	0732	48°42.67'N	126°16.80'W	135/475	32604
		2						32189
CLAYOQUOT SOUND								
	9	1	May 16	1540	48°55.60'N	126°22.90'W	150/154	15520
		2						14413
	10	1	May 16	0910	48°43.10'N	126°46.50'W	200/1304	17703
		2						18586
		1		0930			200-500/1304	36115
		2						36342
		1		1015			500-700/1304	45738
		2						45174

[a]Net type 1=230 µm nitex mesh
2=350 µm nitex mesh

Appendix table 5. STD station positions occupied during the April 1986 cruise.

Stn. no.	Latitude	Longitude	Date	Time	Depth of cast (m)
1	48°39.00'	125°02.40'	5	0705	45
2	48°35.67'	125°08.75'	5	0753	111
3	48°32.18'	125°15.51'	5	0853	100
4	48°25.30'	125°28.65'	5	0935	120
5	48°18.57'	125°41.35'	5	1105	140
6	48°12.92'	125°51.90'	5	1220	500
7	48°08.48'	126°00.00'	5	1350	500
8	48°00.53'	126°17.00'	5	1540	500
9	48°50.44'	125°27.73'	6	0815	85
10	48°48.68'	125°30.95'	6	0842	100
11	48°46.95'	125°34.24'	6	0905	130
12	48°43.43'	125°40.80'	6	0930	150
13	48°39.94'	125°47.40'	6	1030	55
14	48°32.96'	126°00.50'	6	1155	116
15	48°22.40'	126°20.20'	6	1355	500
16	48°18.95'	126°26.70'	6	1515	500
17	48°15.00'	126°40.00'	4	0715	500
18	48°58.35'	125°47.05'	7	0800	35
19	48°56.61'	125°50.40'	7	0830	40
20	48°53.16'	125°57.00'	7	0902	50
21	48°49.65'	126°03.60'	7	0930	80
22	48°46.18'	126°10.20'	7	1020	125
23	48°42.67'	126°16.80'	7	1100	430
24	48°39.17'	126°23.40'	7	1220	500
25	48°32.20'	126°36.00'	7	1355	500
26	49°02.00'	126°10.30'	14	0824	60
27	48°55.60'	126°22.90'	14	0940	130
28	48°49.20'	126°34.90'	14	1045	290
29	48°31.20'	127°09.30'	14	1400	500
30	49°25.50'	126°49.00'	11	0639	75
31	49°16.00'	127°01.50'	11	0800	160
32	49°07.00'	127°13.80'	11	0930	700
33	49°51.50'	127°25.00'	10	1015	60
34	49°47.20'	127°29.00'	10	0831	75
35	49°40.10'	127°40.30'	10	0815	500
36	50°04.00'	128°07.20'	8	1500	140
37	50°05.80'	127°59.80'	9	1855	
38	50°03.40'	127°55.10'	9	1700	
39	50°01.70'	127°50.70'	8	1305	500
40	49°57.40'	127°53.00'	8	1423	125
41	49°57.00'	128°06.20'	9	1525	170
42	50°00.60'	128°00.00'	9	1605	325
43	50°24.00'	128°02.00'	8	1100	75
44	50°21.50'	128°06.70'	9	1025	90
45	50°17.90'	128°12.90'	9	0945	170

Appendix table 5 (cont'd)

Stn. no.	Latitude	Longitude	Date	Time	Depth of cast (m)
46	50°13.10'	128°22.70'	9	0830	500
47	50°07.50'	128°35.00'	9	0700	500
48	48°22.42'	126°04.12'	4	1520	500
49	48°44.94'	125°22.00'	5	0050	90
50	48°51.08'	125°39.20'	4	2324	40
51	48°41.15'	125°27.05'	5	0150	120
52	48°40.60'	125°46.25'	4	2114	90
53	48°28.90'	125°15.40'	3	1020	135
54	48°23.45'	125°20.80'	3	1205	110

Appendix table 6. STD station positions occupied during the May 1986 cruise.

Stn. no.	Latitude	Longitude	Date	Time	Depth of cast (m)
1	48°35.67'	125°08.72'	15	1408	107
2	48°28.68'	125°22.10'	15	1603	147
3	48°18.57'	125°41.35	11	0805	140
4	48°12.92'	125°51.90'	11	0935	500
5	48°08.48'	126°00.00'	11	1213	500
6	48°00.53'	126°17.00'	11	1400	500
7	48°48.68'	125°30.95'	12	1705	90
8	48°43.43'	125°40.80'	12	1608	159
9	48°36.46'	125°54.00'	12	1500	80
10	48°28.43'	126°08.00'	12	1340	200
11	48°24.70'	126°15.80'	12	1226	500
12	48°18.95'	126°26.70'	12	0940	500
13	48°15.00'	126°40.00'	12	0805	200
14	48°58.35'	125°47.05'	14	0942	30
15	48°53.16'	125°57.00'	15	1010	166
16	48°46.18'	126°10.20'	14	1225	145
17	48°39.17'	126°23.40°	14	1403	500
18	48°32.20'	126°36.60'	14	1600	500
19	49°02.00'	126°10.30'	16	1745	65
20	48°55.60'	126°22.90'	16	1500	150
21	48°49.20'	126°34.90'	16	1340	300
22	48°31.20'	127°09.30'	16	0700	500

Appendix table 7. Abundance estimates (Nos./1000 m^3) of sablefish larvae by station using the neuston samples. R/V G.B. REED, April 2-18, 1986. (D indicates tows conducted during daylight hours.)

Locality	Stn. no.	Date	Time	m^3/tow	Sablefish larvae		
					Total nos.	Nos./1000 m^3	Nos./ 1000 m^3/stn.
PACHENA POINT							
	1	Apr. 6	0459	173.2	1	5.8	5.8
	2	Apr. 3	0905D	295.2	0	-	-
		Apr. 6	0408	258.1	13	50.4	50.4
	3	Apr. 6	0338	218.1	1	4.6	4.6
	4	Apr. 6	0307	220.2	4	18.2	18.2
	5	Apr. 3	1329D	205.1	1	4.9	4.9
		Apr. 6	0218	198.1	0	-	-
	7	Apr. 3	1515D	271.2	6	22.1	22.1
		Apr. 6	0045	224.5	0	-	-
	8	Apr. 5	2347	219.6	1	4.6	4.6
	9	Apr. 3	1725D	248.8	4	16.1	16.1
		Apr. 5	2258	227.6	0	-	-
	10	Apr. 3	1916	311.9	3	9.6	4.8
		Apr. 5	2217	327.9	0	-	
	11	Apr. 3	2156	350.5	3	8.6	4.3
		Apr. 5	2140	315.5	0	-	
	12	Apr. 3	2241	331.3	11	33.2	16.6
		Apr. 5	2105	282.3	9	-	
	13	Apr. 3	2340	338.8	3	8.9	9.2
		Apr. 5	2007	319.0	3	9.4	
	14	Apr. 4	0040	287.7	9	31.3	35.9
		Apr. 5	1915	295.7	12	40.6	
BARKLEY SOUND							
	16	Apr. 15	1930	283.6	3	10.6	10.6
	20	Apr. 4	1928	236.6	0	-	
		Apr. 6	2255	206.7	0	-	
			2300	200.8	1	5.0	1.8
		Apr. 15	2237	218.9	0	-	
			2250	250.2	1	4.0	
	23	Apr. 6	2050	142.4	0	-	
			2105	201.1	2	9.9	2.5
		Apr. 16	0004	140.8	0	-	
			0024	146.4	0	-	
	25	Apr. 6	2012	127.0	4	31.5	43.3
			2030	199.7	11	55.1	
	26	Apr. 4	1130D	341.8	0	-	-
		Apr. 6	1915	193.6	0	-	
			1930	181.7	6	33.0	8.3
		Apr. 16	0143	187.8	0	-	
			0154	143.8	0	-	

Appendix table 7 (cont'd)

Locality	Stn. no.	Date	Time	m^3/tow	Sablefish larvae		
					Total nos.	Nos./1000 m^3	Nos./ 1000 m^3/stn.
WICKANINNISH BAY							
	27	Apr. 8	0320	130.9	0	-	2.9
			0335	174.5	1	5.7	
	30	Apr. 8	0055	154.5	7	45.3	54.6
			0113	125.3	8	63.8	
	31	Apr. 8	0003	158.2	2	12.6	30.7
			0018	143.6	7	48.7	
	32	Apr. 7	2300	209.9	1	4.8	14.2
			2315	211.7	5	23.6	
	33	Apr. 7	2200	229.2	1	4.4	2.2
			2215	221.5	0	-	
	34	Apr. 7	2104	218.0	1	4.6	4.8
			2120	197.9	1	5.1	
	35	Apr. 7	2014	204.3	2	9.8	7.0
			2027	236.9	1	4.2	
	36	Apr. 7	1915	206.4	32	155.0	141.1
			1930	212.1	27	127.3	
CLAYOQUOT SOUND							
	41	Apr. 15	0300	327.0	1	3.1	3.1
	44	Apr. 14	2240	307.5	12	39.0	39.0
	45	Apr. 14	2120	288.0	9	31.3	31.3
	46	Apr. 14	2016	307.2	3	9.8	9.8
	47	Apr. 14	1900	304.8	14	45.9	45.9
NOOTKA SOUND							
	54	Apr. 13	2330	237.4	11	46.3	46.3
KYUQUOT SOUND							
	58	Apr. 10	2145	220.8	1	4.5	2.3
			2200	214.5	0	-	
BROOKS PENINSULA							
	67	Apr. 9	2355	115.7	0	-	2.6
		Apr. 10	0010	194.5	1	5.1	

Appendix table 8. Abundance estimates (Nos./1000 m^3) of sablefish larvae by station using the neuston sampler. R/V G.B. REED, May 10-18, 1986. (D indicates tows conducted during daylight hours.)

Locality	Stn. no.	Date	Time	m^3/tow	Sablefish larvae		
					Total nos.	Nos./1000 m^3	Nos./ 1000 m^3/stn.
PACHENA POINT							
	5	May 11	0405	252.0	1	4.0	2.0
			0420	278.9	0	-	
		May 15	1610D	241.8	0	-	0
	7	May 11	1804D	281.5	0	-	0
			2153	181.0	0	-	2.5
			2208	200.5	1	5.0	
	9	May 11	1649D	207.0	2	9.7	9.7
			2345	92.2	0	-	7.0
		May 12	0005	146.6	2	13.9	
	10	May 12	0044	174.7	6	34.3	25.3
			0052	184.6	3	16.3	
	11	May 11	1605D	259.7	0	-	0
		May 12	0122	191.6	5	26.1	37.5
			0135	183.9	9	48.9	
	12	May 12	0204	200.1	4	20.0	25.5
			0220	194.1	6	30.9	
	13	May 11	1452D	229.9	0	-	0
		May 12	0306	148.5	12	80.8	78.1
			0319	199.3	15	75.3	
	14	May 12	0408	239.6	50	208.7	148.9
			0423	291.8	26	89.1	
BARKLEY SOUND							
	21	May 16	0135	185.3	11	59.4	59.4
	22	May 16	0217	181.3	8	44.1	44.1
	23	May 16	0258	207.4	14	67.5	67.5
	24	May 16	0337	199.5	10	50.1	50.1
WICKANINNISH BAY							
	29	May 15	0152	200.2	1	5.0	5.0
	30	May 14	1316D	180.6	4	22.1	22.1
		May 15	0109	221.5	4	18.1	18.1
	31	May 15	0017	206.0	4	19.4	12.3
			0031	192.7	1	5.2	
	32	May 14	1506D	184.5	1	5.4	5.4
			2317	198.1	9	45.4	41.9
			2332	208.2	8	38.4	
	33	May 14	2215	215.8	13	60.2	59.9
			2226	201.2	12	59.6	
	34	May 14	1700D	204.2	1	4.9	4.9
			2111	170.4	2	11.7	17.4
			2125	130.1	3	23.1	

Appendix table 8 (cont'd)

Locality	Stn. no.	Date	Time	m^3/tow	Sablefish larvae		
					Total nos.	Nos./1000 m^3	Nos./ 1000 m^3/stn.
CLAYOQUOT SOUND							
	37	May 16	2237	180.9	1	5.5	5.5
	38	May 16	1515D	183.0	3	16.4	16.4
			2337	237.3	5	21.1	21.1
	39	May 16	1349D	237.1	6	25.3	25.3
		May 17	0105	156.6	7	44.7	44.7
	40	May 17	0221	194.5	12	61.7	61.7
	41	May 17	0333	187.2	3	16.0	16.0
	42	May 16	0635D	275.8	5	18.1	18.1
		May 17	0445	233.9	11	47.0	47.0

Appendix table 9. Abundance estimates (Nos./1000 m^3) of Pacific herring and lingcod larvae by station using the neuston sampler. R/V G.B. REED, April 2-18, 1986. (D indicates tows conducted during daylight hours)

Locality	Stn. no.	Date	Time	Pacific herring			Lingcod		
				Total	Nos./ 1000 m^3	Nos./ 1000 m^3/stn.	Total	Nos./ 1000 m^3	Nos./ 1000 m^3/stn.
PACHENA POINT									
	1	Apr. 6	0459				2	11.5	11.5
	2	Apr. 3	0905D	3	10.2	7.0	2	6.8	5.4
		Apr. 6	0408	1	3.9		1	3.9	
	3	Apr. 6	0338	1	4.6	4.6	1	4.6	4.6
	5	Apr. 3	1329D				1	4.9	25.1
		Apr. 6	0218				4	20.2	
	6	Apr. 6	0127				7	40.4	40.4
	7	Apr. 3	1515D				0	-	-
		Apr. 6	0045				7	31.2	31.2
	8	Apr. 5	2347				9	41.0	41.0
	9	Apr. 3	1725D				0	-	-
		Apr. 5	2258				14	61.5	61.5
	10	Apr. 3	1916D				0	-	-
		Apr. 5	2217				13	39.6	39.6
	11	Apr. 3	2156				0	-	11.1
		Apr. 5	2140				7	22.2	
	12	Apr. 3	2241				0	-	1.8
		Apr. 5	2105				1	3.5	
	13	Apr. 3	2340				0	-	4.7
		Apr. 5	2007				3	9.4	
	14	Apr. 4	0040				1	3.5	1.7
		Apr. 5	1915D				0	-	
BARKLEY SOUND									
	15	Apr. 7	0315	65	577.3	734.3	3	26.6	21.4
			0330	219	891.3		4	16.3	
	16	Apr. 15	1930	554	1953.5	989.4	6	21.2	134.8
			1945	6	25.3		59	248.3	

Appendix table 9 (cont'd)

Locality	Stn. no.	Date	Time	Pacific herring			Lingcod		
				Total	Nos./$_3$ 1000 m^3	Nos./$_3$ 1000 m^3/stn.	Total	Nos./$_3$ 1000 m^3	Nos./$_3$ 1000 m^3/stn.
BARKLEY SOUND									
	17	Apr. 7	0200	559	3709.3	3347.7	33	219.0	252.2
			0220	450	2986.1		43	285.3	
	18	Apr. 7	0103	116	769.7		-	-	
			0120	173	1369.8	555.1	4	31.7	
		Apr. 15	2107	5	23.1		-	-	
			2120	11	57.9		-	-	
	19	Apr. 7	0010	1	5.8	14.3	1	5.8	5.8
			0027	4	22.9		1	5.7	
	20	Apr. 4	1928	62	262.0		25	105.7	
		Apr. 6	2255	1	4.8	53.4	1	4.8	
			2300	0	-		2	10.0	26.8
		Apr. 15	2237	0	-		3	13.7	
			2250	0	-		0	-	
	21	Apr. 6	2200	3	18.9	11.6	1	6.3	18.2
			2215	1	4.3		7	30.1	
	23	Apr. 6	2050	0	-		3	21.2	
			2105	0	-	1.8	2	9.9	16.6
		Apr. 16	0004	1	7.1		4	28.4	
			0024	0	-		1	6.8	
	25	Apr. 6	2012				0	-	10.0
			2030				4	20.0	
	26	Apr. 4	1130D	0	-	-	0	-	-
		Apr. 6	1915	16	82.6		15	77.5	
			1930	4	22.0	26.2	0	-	19.4
		Apr. 16	0143	0	-		0	-	
			0154	0	-		0	-	

Appendix table 9 (cont'd)

Locality	Stn. no.	Date	Time	Pacific herring			Lingcod		
				Total	Nos./$_3$ 1000 m^3	Nos./$_3$ 1000 m^3/stn.	Total	Nos./$_3$ 1000 m^3	Nos./$_3$ 1000 m^3/stn.
WICKANINNISH BAY									
	27	Apr. 8	0320	4	30.6	32.5	1	7.6	6.7
			0335	6	34.4		1	5.7	
	28	Apr. 8	0234				0	-	8.3
			0257				2	16.7	
	29	Apr. 8	0147	45	375.9	209.0			
			0204	5	42.1				
	31	Apr. 8	0003				5	31.6	15.8
			0018				0	-	
	36	Apr. 7	1915				0	-	2.4
			1930				1	4.7	
CLAYOQUOT SOUND									
	37	Apr. 15	0507	9	30.2	30.2	6	20.1	20.1
	38	Apr. 15	0445	7	24.4	24.4	24	83.8	83.8
	39	Apr. 15	0415				2	7.0	7.0
	40	Apr. 15	0325	1	3.5	3.5	4	14.0	14.0
	46	Apr. 14	2016				1	3.3	3.3
NOOTKA SOUND									
	48	Apr. 12	1935	152	796.2	796.2	1	5.2	5.2
	49	Apr. 12	2018	358	1787.3	1100.7			
			2032	102	414.1				
	50	Apr. 13	1922	24	122.3	127.9	55	280.2	214.3
			1927	27	133.5		30	148.4	
	51	Apr. 13	2032				11	57.6	57.6
	54	Apr. 13	2330				2	8.4	8.4

Appendix table 9 (cont'd)

Locality	Stn. no.	Date	Time	Pacific herring			Lingcod		
				Total	Nos./$_3$ 1000 m^3	Nos./$_3$ 1000 m^3/stn.	Total	Nos./$_3$ 1000 m^3	Nos./$_3$ 1000 m^3/stn.
KYUQUOT SOUND									
	55	Apr. 10	1300D	1	6.4	57.8			
			2012	24	109.1				
	56	Apr. 10	1412D	0	-	18.9			
			1922	8	37.9				
	57	Apr. 10	2056	28	149.3	119.1	0	-	3.4
			2112	13	89.0		1	6.8	
	58	Apr. 10	2145				18	81.5	66.4
			2200				11	51.3	
	59	Apr. 10	2245				0	-	19.0
			2300				9	37.9	
	60	Apr. 11	0004				2	12.2	14.7
			0015				3	17.2	
	61	Apr. 11	0135	1	7.2	3.6			
			0150	0	-				
BROOKS PENINSULA									
	62	Apr. 9	2005	47	263.6	143.5	48	269.2	505.9
			2020	5	23.4		159	742.6	
	63	Apr. 9	2030	1	4.7	2.4	22	104.4	84.1
			2050	0	-		15	63.8	
	64	Apr. 9	2115				1	5.0	4.8
			2135				1	4.6	
	65	Apr. 9	2210				2	11.3	13.8
			2225				3	16.3	
	66	Apr. 9	2305	2	9.0	4.5	4	18.0	9.0
			2315	0	-		0	-	
	67	Apr. 9	2355				1	8.6	6.9
		Apr. 10	0010				2	5.1	

Appendix table 9 (cont'd)

Locality	Stn. no.	Date	Time	Pacific herring			Lingcod		
				Total	Nos./$_3$ 1000 m^3	Nos./$_3$ 1000 m^3/stn.	Total	Nos./$_3$ 1000 m^3	Nos./$_3$ 1000 m^3/stn.
QUATSINO SOUND									
	68	Apr. 8	1936				1	3.5	3.5
	69	Apr. 8	2007	1	3.4	3.4			
	70	Apr. 8	2104	10	52.4	600.9	1	5.2	7.7
			2121	227	1149.4		2	10.1	
	71	Apr. 8	2145	20	133.3	79.7	2	13.3	37.1
			2201	3	26.1		7	60.9	
	72	Apr. 8	2240	0	-	2.4	4	19.1	19.0
			2255	1	4.7		4	18.9	
	73	Apr. 8	2355				2	8.7	15.8
		Apr. 9	0010				3	22.8	
	74	Apr. 9	0135				7	45.4	32.6
			0200				3	19.8	

Appendix table 10. Abundance estimates (nos./1000 m^3) of Pacific herring and lingcod larvae by station using the neuston sampler. R/V G.B. REED, May 10-18, 1986. (D indicates tows conducted during daylight hours.)

Locality	Stn. no.	Date	Time	Pacific herring			Lingcod		
				Total	Nos./ 1000 m^3	Nos./ 1000 m^3/stn.	Total	Nos./ 1000 m^3	Nos./ 1000 m^3/stn.
PACHENA POINT									
	1	May 11	0050	17	118.8	98.2			
			0106	13	77.6				
	2	May 11	0145	54	258.5	297.9			
			0200	64	337.2				
		May 15	1424D	0	-	-			
	3	May 11	0226	3	14.9	10.5			
			0243	1	6.1				
	4	May 11	0303	18	79.7	183.7	2	8.9	7.2
			0321	53	287.7		1	5.4	
	5	May 11	0405	58	230.2	258.5			
			0420	80	286.8				
		May 15	1610D	0	-	-			
	6	May 11	0457	37	148.0	76.2			
			2115	1	4.5				
	7	May 11	1804	1	3.6		0	-	
			2153	10	55.2	46.2	1	5.5	1.8
			2208	16	79.9		0	-	
	8	May 11	2245	2	25.5	37.4			
			2300	5	49.3				
	9	May 11	1649D	1	4.8	4.8			
			2345	0	-				
		May 12	0005	2	13.6	6.8			
	11	May 11	1605D	0	-	-			
		May 12	0122	1	5.2	2.6			
			0135	0	-				
	13	May 11	1452D	2	8.7	8.7			
		May 12	0306	0	-	-			
			0319	0	-				

Appendix table 10 (cont'd)

Locality	Stn. no.	Date	Time	Pacific herring			Lingcod		
				Total	Nos./$_3$ 1000 m^3	Nos./$_3$ 1000 m^3/stn.	Total	Nos./$_3$ 1000 m^3	Nos./$_3$ 1000 m^3/stn.
BARKLEY SOUND									
	15	May 15	2126	7	43.2	43.2			
	16	May 15	1055D	0	-	-			
			2157	6	35.3	35.3			
WICKANINNISH BAY									
	26	May 14	1006D	0	-	-			
		May 15	0356	3	14.9	14.9			
	27	May 15	0315	1	5.5	5.5			
	29	May 15	0152	22	109.9	109.9			
	34	May 14	1700D	0	-	-			
			2111	2	11.7	5.9			
			2125	0	-				
CLAYOQUOT SOUND									
	36	May 16	2045	8	47.7	47.7	2	11.9	11.9
	37	May 16	1750D	0	-	4.6	1	3.8	4.2
			2141	2	9.1		1	4.6	
	38	May 16	2237	1	5.5	5.5	1	5.5	5.5

Appendix table 11. Abundance estimates (nos./1000 m^3) of Pacific sand lance and rockfish larvae by station using the neuston sampler. R/V. G.B. REED, April 2-18, 1986. (D indicates tows conducted during daylight hours.)

Locality	Stn. no.	Date	Time	Pacific sand lance			Rockfish		
				Total	Nos./$_3$ 1000 m^3	Nos./$_3$ 1000 m^3/stn.	Total	Nos./$_3$ 1000 m^3	Nos./$_3$ 1000 m^3/stn.
PACHENA POINT									
	2	Apr. 6	0905D	0	-	7.7			
			0408	4	15.5				
	3	Apr. 6	0338	5	22.9	22.9			
	4	Apr. 6	0307	6	27.2	27.2			
		Apr. 3	1329D	0	-	17.7			
	5	Apr. 6	0218	7	35.3				
	6	Apr. 6	0127	8	46.2	46.2			
	7	Apr. 3	1515D	13	47.9	44.0			
		Apr. 6	0045	9	40.1				
	8	Apr. 5	2347	10	45.5	45.5			
	9	Apr. 4	1725D	11	44.2	46.3			
		Apr. 5	2258	11	48.3				
	10	Apr. 3	1916	44	141.1	142.2			
		Apr. 5	2217	47	143.3				
	11	Apr. 3	2156	8	22.8	20.9			
		Apr. 5	2140	6	19.0				
	12	Apr. 3	2241	1	3.0	31.6			
		Apr. 5	2105	17	60.2				
	13	Apr. 3	2340	4	11.8	67.0			
		Apr. 5	2007	39	122.3				
	14	Apr. 4	0040	0	-	18.6			
		Apr. 5	1915	11	37.2				
BARKLEY SOUND									
	15	Apr. 7	0315	0	-	14.2			
			0330	7	28.5				
	16	Apr. 15	1930	1	3.5	3.9			
			1945	1	4.2				

Appendix table 11 (cont'd)

Locality	Stn. no.	Date	Time	Pacific sand lance			Rockfish		
				Total	Nos./$_3$ 1000 m^3	Nos./$_3$ 1000 m^3/stn.	Total	Nos./$_3$ 1000 m^3	Nos./$_3$ 1000 m^3/stn.
BARKLEY SOUND									
	17	Apr. 7	0200	5	33.2	41.2			
			0220	8	49.2				
	18	Apr. 7	0103	4	26.5	29.1			
			0120	4	31.7				
	19	Apr. 7	0010	2	11.5	11.5			
			0027	2	11.4				
	20	Apr. 4	1928	19	80.3				
		Apr. 6	2255	4	19.4				
			2300	6	29.9	27.6			
		Apr. 15	2237	1	4.6				
			2250	1	4.0				
	21	Apr. 6	2200	3	18.9	26.7			
			2215	8	34.4				
	22	Apr. 4	1813D	1	3.6	3.9			
	23	Apr. 6	2050	2	14.0				
			2105	10	49.7	15.9			
		Apr. 16	0004	0	-				
			0024	0	-				
	25	Apr. 6	2012	5	39.4	57.3			
			2030	15	75.1				
	26	Apr. 4	1130D	0	-	-			
		Apr. 6	1915	76	392.6				
			1930	39	214.6	154.9			
		Apr. 16	0143	1	5.3				
			0154	1	7.0				

Appendix table 11 (cont'd)

Locality	Stn. no.	Date	Time	Pacific sand lance			Rockfish		
				Total	Nos./$_3$ 1000 m^3	Nos./$_3$ 1000 m^3/stn.	Total	Nos./$_3$ 1000 m^3	Nos./$_3$ 1000 m^3/stn.
WICKANINNISH BAY									
	27	Apr. 8	0320	5	38.2	22.0			
			0335	1	5.7				
	31	Apr. 8	0003	1	6.3				
			0018	0	-	3.2			
	32	Apr. 7	2300	0	-				
			2315	3	14.2	7.1			
	33	Apr. 7	2200	2	8.7				
			2215	6	27.1	17.9			
	36	Apr. 7	1915	2	9.7				
			1930	2	9.4	9.6			
CLAYOQUOT SOUND									
	37	Apr. 15	0507	32	107.3	107.3			
	38	Apr. 15	0445	28	97.8	97.8			
	40	Apr. 15	0325	3	10.5	10.5			
	41	Apr. 15	0300	5	15.3	15.3			
	43	Apr. 14	2350	1	4.2	4.2			
NOOTKA SOUND									
	48	Apr. 12	1935	11	57.6	57.6	30	157.2	157.2
	49	Apr. 12	2018	50	250.0	149.4			
			2032	12	48.7				
	50	Apr. 13	1922	156	794.7	995.8			
			1927	242	1196.8				
	51	Apr. 13	2032	10	52.4	52.4			
	52	Apr. 13	2132	1	5.1	5.1	1	5.1	5.1

Appendix table 11 (cont'd)

Locality	Stn. no.	Date	Time	Pacific sand lance			Rockfish		
				Total	Nos./$_3$ 1000 m^3	Nos./$_3$ 1000 m^3/stn.	Total	Nos./$_3$ 1000 m^3	Nos./$_3$ 1000 m^3/stn.
KYUQUOT SOUND									
	55	Apr. 10	1300D	1	6.4	3.2			
			2012	0	-				
	56	Apr. 10	1412D	0	-	4.7	1	6.2	3.1
			1922	2	9.5		0	-	
	58	Apr. 10	2145				0	-	2.3
			2200				1	4.7	
	59	Apr. 10	2245				1	4.1	10.5
			2300				4	16.8	
	60	Apr. 11	0004	0	-	2.9			
			0015	1	5.7				
	61	Apr. 11	0135	5	36.2	32.6			
			0150	5	29.1				
BROOKS PENNINSULA									
	62	Apr. 9	2005	412	2310.7	1517.3			
			2020	155	724.0				
	63	Apr. 9	2030	36	170.9	117.4			
			2050	15	63.8				
	64	Apr. 9	2115	2	9.9	7.2			
			2135	1	4.6				
	65	Apr. 9	2210	1	5.6	2.8			
			2225	0	-				
	66	Apr. 9	2305	2	9.0	9.2			
			2315	2	9.3				
	67	Apr. 9	2355	2	17.3	24.1			
		Apr. 10	0010	6	30.8				

Appendix table 11 (cont'd)

Locality	Stn. no.	Date	Time	Pacific sand lance			Rockfish		
				Total	Nos./$_3$ 1000 m^3	Nos./$_3$ 1000 m^3/stn.	Total	Nos./$_3$ 1000 m^3	Nos./$_3$ 1000 m^3/stn.
QUATSINO SOUND									
	68	Apr. 8	1936	7	24.5	24.5			
	70	Apr. 8	2104	0	-	2.5			
			2121	1	5.1				
	72	Apr. 8	2240	1	4.8	21.3	1	4.8	2.4
			2255	8	37.8		0	-	
	73	Apr. 8	2355	0	-	3.8	1	4.3	2.2
		Apr. 9	0010	1	7.6		0	-	
	74	Apr. 9	0135	3	19.4	13.0			
			0200	1	6.6				

Appendix table 12. Abundance estimates (nos./1000 m^3) of Pacific sand lance and rockfish larvae by station using the neuston samples. R/V G.B. REED, May 10-18, 1986. (D indicates tows conducted during daylight hours.)

Locality	Stn. no.	Date	Time	Pacific sand lance			Rockfish		
				Total	Nos./$_3$ 1000 m^3	Nos./$_3$ 1000 m^3/stn.	Total	Nos./$_3$ 1000 m^3	Nos./$_3$ 1000 m^3/stn.
PACHENA POINT									
	1	May 11	0050	20	139.8	129.6	1	7.0	3.5
			0106	20	119.4		0	-	
	2	May 11	0145	159	761.1	1402.7			
			0200	388	2044.3				
		May 15	1424D	0	-	-			
	3	May 11	0226	361	1790.7	1893.5			
			0243	328	1996.3				
	4	May 11	0303	479	2120.4	2338.7			
			0321	471	2557.0				
	5	May 11	0405	720	2857.1	2063.2			
			0420	354	1269.3				
		May 15	1610D	0	-	-			
	6	May 11	0457	118	472.0	265.1	1	4.0	2.0
			2115	13	58.3		0	-	
	7	May 11	1804	0	-		0	-	
			2153	0	-	13.3	1	5.5	1.8
			2208	8	39.9		0	-	
	8	May 11	2245	0	-	14.8			
			2300	3	29.6				
	9	May 11	1649D	1	4.8	4.8			
			2345	0	-	13.6			
		May 12	0005	4	27.3				
	10	May 12	0044	0	-	2.7			
			0052	1	5.4				

Appendix table 12 (cont'd)

Locality	Stn. no.	Date	Time	Pacific sand lance			Rockfish		
				Total	Nos./$_3$ 1000 m^3	Nos./$_3$ 1000 m^3/stn.	Total	Nos./$_3$ 1000 m^3	Nos./$_3$ 1000 m^3/stn.
PACHENA POINT									
	13	May 11	1452D	5	21.7	21.7			
		May 12	0306	0	-	-			
			0319	0	-				
	14	May 12	0408	0	-	-	0	-	1.7
			0423	0	-		1	3.4	
BARKLEY SOUND									
	15	May 15	2126	4	24.7	24.7			
	16	May 15	1055D	0	-	-			
			2157	9	53.0	53.0			
	17	May 15	2242	27	175.2	175.2			
	18	May 15	0917D	1	5.2	5.2			
			2329	10	57.6	57.6			
	19	May 16	0013	20	90.1	90.1			
	20	May 15	0800D	0	-	-			
		May 16	0054	2	10.0	10.0			
WICKANINNISH BAY									
	26	May 14	1006D	0	-	-			
		May 15	0356	27	134.4	134.4			
	27	May 15	0315	4	21.9	21.9			
	28	May 14	1135D	0	-	-			
		May 15	0234	22	98.2	98.2			

Appendix table 12 (cont'd)

Locality	Stn. no.	Date	Time	Pacific sand lance			Rockfish		
				Total	Nos./$_3$ 1000 m^3	Nos./$_3$ 1000 m^3/stn.	Total	Nos./$_3$ 1000 m^3	Nos./$_3$ 1000 m^3/stn.
WICKANINNISH BAY									
	29	May 15	0152	225	1123.9	1123.9			
	30	May 14	1316D	0	-	6.8			
		May 15	0109	3	13.5				
	31	May 15	0017	0	-	2.6			
			0031	1	5.2				
	32	May 14	1506D	0	-	-	0	-	-
			2317	0	-	-	1	5.0	2.6
			2332	0	-		0	-	
	34	May 14	1700D	0	-	-	0	-	-
			2111	2	11.7	5.9	1	5.9	2.9
			2125	0	-		0	-	
CLAYOQUOT SOUND									
	36	May 16	2045	6	35.8	35.8			
	37	May 16	1750D	0	-	-	2	7.7	7.7
			2141	4	18.3	18.3	2	9.1	9.1
	38	May 16	2237	2	11.1	11.1	1	5.5	5.5
	39	May 16	1515D	0	-	-	0	-	-
			2337	0	-	-	2	8.4	8.4
	40	May 16	1349D	0	-	-	1	4.2	4.2
		May 17	0105	0	-	-	0	-	-
	42	May 16	0635D	0	-	-	3	10.9	10.9
		May 17	0445	0	-	-	0	-	-

Appendix table 13. Numbers of other larval fish and fish eggs caught in the neuston tows by station. R/V G.B. REED, April 2-18, 1986.

	PACHENA POINT																		
	Day tows					Night tows													
Station no.	2	5	7	9	T	1	2	3	4	5	6	7	8	9	10	11	12	13	14	T
Irish lord (sp.)			3		3								3	1	3	11	25	20	35	98
Sculpin (sp.)	1	1	15	1	18	4	4	3	2	1	2	5	7	2	5	54	4	4		96
Prickleback (sp.)					0				1				1	1						3
Lanternfish (sp.)					0											14	114	87	27	232
Greenling (sp.)		1	6		7		8	3	3	3	2	1	2	1	1	6	8	13	6	57
Smelt (sp.)			3	4	7								1		21			2		24
Snailfish (sp.)					0			1			2		1		2					6
Dwarf wrymouth					0		8	2		6	15	10	7	2	1	32	29	1		113
Cabezon					0								1							1
Poacher (sp.)					0															0
Gunnel (sp.)					0		1			1				1		1				4
Arrowtooth flounder					0													1		1
Lemon sole			5	3	8		2			9	9	3		1	9	2	7			42
Starry flounder					-															-
Three-spined stickleback					-															-
Pacific cod					-															-
Unidentified larvae					-															-
Unidentified eggs			1		1		1		2						55	14	75	125	22	294

Appendix table 13 (cont'd)

	BARKLEY SOUND															WICKANINNISH BAY										
	Day tows				Night tows											Night tows										
Station no.	22	24	26	T	15	16	17	18	19	20	21	22	23	26	T	27	28	29	30	31	32	33	34	35	T
Irish lord (sp.)						1		1		1		20	7	10	40						37	16	11	1	65
Sculpin (sp.)	4			4	18	24	2	25	44	54	14	8	14	4	207	11	37	22	19	2	3				94
Prickleback (sp.)				0		182	2			105					289										0
Lanternfish (sp.)				0		1						27	22	34	84						2		5	19	26
Greenling (sp.)		1	1	2		23	5	8		8	4	2	3	1	54	3	6	1	4	12	7	4	10	1	48
Smelt (sp.)				0	14	40	3	4	1	27				2	91		1	1			1				3
Snailfish (sp.)	1			1		3	1	1		2			1		8	2			2			1	1	3	9
Dwarf wrymouth						2	5	5		21	2	14	12	6	67	1					1				2
Cabezon															0										0
Poacher (sp.)															0					1					1
Gunnel (sp.)					2			1	1	1					5										-
Arrowtooth flounder															0										-
Lemon sole					1			4		1					6										-
Starry flounder						3									3										-
Three-spined stickleback									1						1										-
Pacific cod															0										-
Unidentified larvae						1		1			2				4										-
Unidentified eggs		10	583	593						2	1	2	13		18	1					31			20	52

Appendix table 13 (cont'd)

	CLAYOQUOT SOUND												NOOTKA SOUND							
	Night tows												Night tows							
Station no.	37	38	39	40	41	42	43	44	45	46	47	T	48	49	50	51	52	53	54	T
Irish lord (sp.)		1		1			1	1	1	10	27	42			2	2			12	16
Sculpin (sp.)	14		18	5	5	5	1	4			1	53			64		1			65
Prickleback (sp.)		17									1	18	1							1
Lanternfish (sp.)							6	18	30	9		63							3	3
Greenling (sp.)		1	1	3	2		1	3	1	1		13					1			1
Smelt (sp.)	1	2										3	4	65	37	2				108
Snailfish (sp.)				1	1							2		29						29
Dwarf wrymouth				1	3	2			1			7			1	1	1	1	1	5
Cabezon												0								0
Poacher (sp.)												0								0
Gunnel (sp.)												0		1	1					2
Arrowtooth flounder												0	1							1
Lemon sole		1	3									4		13		1				14
Starry flounder												-								0
Three-spined stickleback												-								0
Pacific cod												-	2							2
Unidentified larvae												-								-
Unidentified eggs	7	10	3		48			20	7	23	21	139		1						1

Appendix table 13 (cont'd)

	KYUQUOT SOUND									BROOKS PENINSULA						
	Day tow	Night tows								Night tows						
Station no.	55	55	56	57	58	59	60	61	T	62	63	64	65	66	67	T
Irish lord (sp.)							1	8	9			5	22	24	41	92
Sculpin (sp.)	1	5		4	7	2	1		19	15	4		2	3	3	27
Prickleback (sp.)									0	22						22
Lanternfish (sp.)							1		1			5	13		6	24
Greenling (sp.)					2	1	1	2	6		1	2		1	5	9
Smelt (sp.)		4						1	5	9						9
Snailfish (sp.)									0	10	1	1				12
Dwarf wrymouth									0	9		1	1	2		13
Cabezon									0							0
Poacher (sp.)									0							0
Gunnel (sp.)			1			1			2	6	1					7
Arrowtooth flounder									-							0
Lemon sole									-	5		1				6
Starry flounder									-							-
Three-spined stickleback									-							-
Pacific cod									-							-
Unidentified larvae									-							-
Unidentified eggs							10	1	11							-

Appendix table 13 (cont'd)

	QUATSINO SOUND								SURVEY TOTAL	
	Night tows									
Station no.	68	69	70	71	72	73	74	T	Day	Night
Irish lord (sp.)					24	2	23	49	3	411
Sculpin (sp.)		1	1	11	10		1	24	23	585
Prickleback (sp.)								0	0	333
Lanternfish (sp.)					3		5	8	0	441
Greenling (sp.)				1	5	2	8	16	9	204
Smelt (sp.)								0	7	243
Snailfish (sp.)	1		2	1				4	1	70
Dwarf wrymouth	4	1				2	1	8	0	215
Cabezon								0	0	1
Poacher (sp.)								0	0	1
Gunnel (sp.)	1							1	0	21
Arrowtooth flounder								0	0	2
Lemon sole								0	8	72
Starry flounder								0	-	3
Three-spined stickleback							1	1	-	2
Pacific cod								-	-	2
Unidentified larvae								-	-	4
Unidentified eggs			1					1	594	516

Appendix table 14. Numbers of other larval fish and fish eggs caught in the neuston tows by station. R/V G.B. REED, May 10-18, 1986.

	PACHENA POINT																	
	Day tows				Night tows													
Station no.	2	7	13	T	1	2	3	4	5	6	7	8	9	10	11	12	13	14	T
Irish lord (sp.)				-				1	1	2	5	4	6	2	1		2	4	28
Sculpin (sp.)		3		3	12	1		2	1	6	20		8	2	2			5	59
Prickleback (sp.)		3	1	4	2	37	13	5	4			28	5				4	9	107
Blue lanternfish				0									6	183	215	158	80	3	645
Greenling (sp.)		2		2					1				2		2	4	1	4	14
Smelt (sp.)				0	1	1	1	3	7	22	18								53
Snailfish (sp.)				0	1	1	1	1		1	1								6
Dwarf wrymouth				0															0
Wolf-eel				0															0
Poacher (sp.)		1		1						1	1								3
Gunnel (sp.)				0	1	1	1			35									37
Dover sole				0	1			1	1										3
Lemon sole				0	5	3	4	14	2										28
Pacific cod		18		18	3					2									5
Sand sole				0						1									1
Rex sole				0											1				1
Walleye pollock				0	1														1
Sanddab				0							1								1
Flathead sole		1		1															0
Unidentified larvae				0															0
C-O sole eggs				0															0
Unidentified eggs	1	1	25	27	1	1			1				1					10	14

Appendix table 14 (cont'd)

	BARKLEY SOUND													WICKANINNISH BAY												
	Day tow		Night tows											Day tows				Night tows								
Station no.	20	T	15	16	17	18	19	20	21	22	23	24	T	30	32	34	T	25	26	27	28	29	30	31	32	33	34	T
Irish lord (sp.)	1	1			1		1	1	3				6			3	3			1	2	3	1	1	4	6	9	27
Sculpin (sp.)	1	1		4		23	10	5	10	36	17	2	107				0	7	12	6	4	4	24	17	13	7	12	106
Prickleback (sp.)		-	1							1		2	4				0										145	145
Blue lanternfish		-								25	43	54	122				0							24	3	53		80
Greenling (sp.)		-					3	2	6	5	2	3	21	4			4			1	1	2	4	3	1	1	1	14
Smelt (sp.)		-	21	5	1		1						28				-											0
Snailfish (sp.)		-	1										1				-			4	2	1						7
Dwarf wrymouth		-						1					1				-											0
Wolf-eel		-											0				-									1		1
Poacher (sp.)		-		1			2			1			4				-				1		1					2
Gunnel (sp.)		-											0				-											0
Dover sole		-											0				-		1						1			2
Lemon sole		-											0				-						2					2
Pacific cod		-											0				-											0
Sand sole		-											0				-											0
Rex sole		-											0				-											0
Walleye pollock		-											0				-											0
Sanddab		-											0				-											0
Flathead sole		-											0				-											0
Unidentified larvae		-											0				-	2	2									4
C-O sole eggs		-											0				-						1	2				3
Unidentified eggs		-				4			7	2	3	9	25		70	23	93	3			1		4	1	22	2	4	37

Appendix table 14 (cont'd)

	CLAYOQUOT SOUND															
	Day tows					Night tows									Survey total	
Station no.	36	38	39	42	T	35	36	37	38	39	40	41	42	T	Day	Night
Irish lord (sp.)	1			1	2	1	2	8			1		4	16	6	77
Sculpin (sp.)	8				8	4	17				2	1		24	12	296
Prickleback (sp.)	37				37	2	107	23	19	2	1	1	5	160	41	416
Blue lanternfish					0						10	38		48	0	895
Greenling (sp.)		1	1		2			2	1		1	1	2	7	8	56
Smelt (sp.)	1				1	24	4	1						29	1	110
Snailfish (sp.)					0	5	4	1						10	0	24
Dwarf wrymouth					0									0	0	1
Wolf-eel					0									0	0	1
Poacher (sp.)					0			1	1					2	1	11
Gunnel (sp.)					0									0	0	37
Dover sole					0									0	0	5
Lemon sole					0									0	0	30
Pacific cod					0									0	18	5
Sand sole					0									0	0	1
Rex sole					0									0	0	1
Walleye pollock					0									0	0	1
Sanddab (sp.)					0									0	0	1
Flathead sole					0									0	1	0
Unidentified larvae		1			1									0	1	4
C-O sole eggs					0									0	0	3
Unidentified eggs			6	10	16					12	4	5	12	33	136	109

Appendix table 15. Numbers of larval fish and fish eggs caught in the Bongo (B) tows and Vertical (V) hauls by station and by area. R/V G.B REED, April 2-18, 1986.

	PACHENA POINT										
Station no.	1	2	3	4	5		6			7	
Sampler	B	B	B	B	B^a	B^b	B^a	B^b	B^c	V	T
Pacific cod											-
Walleye pollock	1										1
Pacific herring			1								1
Pacific sand lance			4		1						5
Deepsea smelt (sp.)											0
Smelt (sp.)	3		1								4
Veiled anglemouth									2		2
Northern lampfish		2	3			4					9
Pacific viperfish									1		1
Slender snipe eel											0
Prickleback (sp.)	2	1	9	1	1		2	1			17
Sculpin (sp.)	1		2						1	1	5
Dwarf wrymouth						2					2
Gunnel (sp.)											0
Snailfish (sp.)		1				1			1		3
Ronquil (sp.)											0
Red Brotula											0
Rockfish (sp.)	2		3	2				16	15	2	40
Butter sole	1							1	4		6
Sand sole		1									1
Slender sole	2		1								3
English sole	1		3					1			5
Flathead sole											0
Arrowtooth flounder											0
Unidentified larvae		1	1					2			4
Unidentified eggs	2	6	1	1	6	4	24	3	6		53

Appendix table 15 (cont'd)

	BARKLEY SOUND																	
Station no.	9	10	11	12	12	13	14		14	15			16		17	18	19	20	
Sampler	B	V	B	B	V	V	B[a]	B[b]	V[a]	B[a]	B[b]	B[c]	V[a]	V[d]	V	V	V	V	T
Pacific cod			1	2	1	1										3		2	10
Walleye pollock	1		11	2												1		1	16
Pacific herring	39	5	22	14	1											17	2	16	116
Pacific sand lance	4		3	4			1								2	40		3	57
Deepsea smelt (sp.)								1											1
Smelt (sp.)	41	10	15												2	10		12	90
Veiled anglemouth								2	1			1							4
Northern lampfish											4	3							7
Pacific viperfish																			0
Slender snipe eel								1											1
Prickleback (sp.)	15	2	5	3			2			8			2		3	1			41
Sculpin (sp.)	1										1				1				3
Dwarf wrymouth	3																		3
Gunnel (sp.)	3																	1	4
Snailfish (sp.)	20		2	7												2			31
Ronquil (sp.)																			0
Red Brotula																			0
Rockfish (sp.)			2	8	1	1	2			6									20
Butter sole	11	3		1									1			2	2	1	21
Sand sole	2																		2
Slender sole	7			3															10
English sole	13		1												1		1		16
Flathead sole	1			1															2
Arrowtooth flounder	1																		1
Unidentified larvae	1						3					2							6
Unidentified eggs	23	1	11	13			12	7	1	9	2	8		3	6	1	8	3	108

Appendix table 15 (cont'd)

	NOOTKA SOUND					KYUQUOT SOUND		
Station no.	21	22				23	24	
Sampler	B	B[a]	B[b]	B[c]	T	B	B	T
Pacific cod					-			-
Walleye pollock					-			-
Pacific herring	13				13	5	1	6
Pacific sand lance	3	5			8	3		3
Deepsea smelt (sp.)					0			0
Smelt (sp.)	1				1			0
Veiled anglemouth				2	2			0
Northern lampfish	1	5	2	1	9			0
Pacific viperfish					0			0
Slender snipe eel					0			0
Prickleback (sp.)		4			4			0
Sculpin (sp.)					0			0
Dwarf wrymouth					0			0
Gunnel (sp.)					0	1		1
Snailfish (sp.)		1			1			0
Ronquil (sp.)	1				1			0
Red Brotula					0		1	1
Rockfish (sp.)	17	6		1	24		3	3
Butter sole					0	1		1
Sand sole					0	1		1
Slender sole					0	1		1
English sole					0			0
Flathead sole					0			0
Arrowtooth flounder		2			2			0
Unidentified larvae					0			0
Unidentified eggs	3	6	1	1	11	54		54

[a]-depth of tow 0-200 m
[b]-depth of tow 200-500 m
[c]-depth of tow 500-700 m
[d]-depth of haul 700-0 m

Appendix table 16. Numbers of larval fish and fish eggs caught in the Bongo (B) tows and Vertical (V) hauls by station and by area. R/V G.B. REED, May 10-18, 1986.

	PACHENA POINT							BARKLEY SOUND			
Station no.	1	2	3	4				5		6	
Sampler	B	B	B	B^a	B^b	B^c	T	B^a	B^b	V	T
Pacific tomcod			3				3				-
Sablefish							0				-
Pacific cod		5	2				7				-
Walleye pollock	2	4	5				11				-
Pacific herring	4	4	2				10				-
Pacific sand lance	6		1				7				-
Deepsea smelt (sp.)						1	1				-
Smelt (sp.)	3	6					9				-
Veiled anglemouth					1	1	2				-
Northern lampfish					8	2	10		1		1
Lanternfish (sp.)						2	2				0
Prickleback (sp.)	3	11	4	6	1	1	26			1	1
Sculpin (sp.)				2		1	3				0
Dwarf wrymouth		1					1				0
Poacher (sp.)	1	1					2				0
Cabezon							0				0
Snailfish (sp.)	1	3	5	4			13		1		1
Rockfish (sp.)		11	14		2		27	1			1
Butter sole		4	6				10				0
Flathead sole			3				3				0
Rex sole	1	6		1			8				0
Dover sole							0				0
Unidentified larvae						1	1				0
Unidentified eggs				2	7	4	13	2	5	1	8

Appendix table 16 (cont'd)

	WICKANINNISH BAY			CLAYOQUOT SOUND				
Station no.	7	8		9	10			
Sampler	B	B	T	B	B[a]	B[b]	B[c]	T
Pacific tomcod			-					-
Sablefish			-			1		1
Pacific cod			-					0
Walleye pollock			-					0
Pacific herring	15		15					0
Pacific sand lance	1		1	1				1
Deepsea smelt (sp.)			0		1			1
Smelt (sp.)	1		1					0
Veiled anglemouth			0				1	1
Northern lampfish			0			2	1	3
Lanternfish (sp.)			0		2	8	11	21
Prickleback (sp.)	2	1	3	3				3
Sculpin (sp.)	6		6					0
Dwarf wrymouth			0					0
Poacher (sp.)		1	1					0
Cabezon			0			1	1	2
Snailfish (sp.)	4	3	7					0
Rockfish (sp.)	5	4	9	1			6	7
Butter sole	1	1	2	1				1
Flathead sole		1	1					0
Rex sole	1	4	5					0
Dover sole		1	1					0
Unidentified larvae			0		1		1	2
Unidentified eggs		1	1		5	5	3	13

[a]-depth of tow 0-200 m
[b]-depth of tow 200-500 m
[c]-depth of tow 500-700 m

Appendix table 17. Abundance estimates (nos./1000 m³) of Pacific herring and Pacific cod by station using the bongo sampler. R/V G.B. REED, April 2-18, 1986. (1=230 µm mesh, and 2=350 µm mesh). Net depth is the maximum depth fished.

Locality	Stn. no.	Net depth (m)	Mesh size	Pacific herring		Pacific cod	
				Total	Nos./ 1000 m³	Total	Nos./ 1000 m³
PACHENA POINT	1	105	1	0	-	0	-
			2	0	-	0	-
	2	155	1	0	-	0	-
			2	0	-	0	-
	3	148	1	0	-	0	-
			2	1	5.4	0	-
	4	217	1	0	-	0	-
			2	0	-	0	-
	5	200	1	0	-	0	-
			2	0	-	0	-
		200-500	1	0	-	0	-
			2	0	-	0	-
	6	200	1	0	-	0	-
			2	0	-	0	-
		200-500	1	0	-	0	-
			2	0	-	0	-
		500-700	1	0	-	0	-
			2	0	-	0	-

Appendix table 17 (cont'd)

Locality	Stn. no.	Net depth (m)	Mesh size	Pacific herring		Pacific cod	
				Total	Nos./ 1000 m³	Total	Nos./ 1000 m³
BARKLEY SOUND	9	150	1	15	86.2	0	-
			2	24	140.0	0	-
	11	100	1	12	113.0	0	-
			2	10	96.4	1	9.6
	12	200	1	3	10.3	1	3.4
			2	11	38.8	1	3.5
	14	200	1	0	-	0	-
			2	0	-	0	-
		200-500	1	0	-	0	-
			2	0	-	0	-
	15	200	1	0	-	0	-
			2	0	-	0	-
	15	200-500	1	0	-	0	-
			2	0	-	0	-
		500-700	1	0	-	0	-
			2	0	-	0	-

Appendix table 17 (cont'd)

Locality	Stn. no.	Net depth (m)	Mesh size	Pacific herring		Pacific cod	
				Total	Nos./ 1000 m³	Total	Nos./ 1000 m³
NOOTKA SOUND	21	160	1	5	27.6	0	-
			2	8	45.2	0	-
	22	200	1	0	-	0	-
			2	0	-	0	-
		200-500	1	0	-	0	-
			2	1	2.5	0	-
		500-700	1	0	-	0	-
			2	0	-	0	-
KYUQUOT SOUND	23	150	1	3	13.7	0	-
			2	2	9.8	0	-
	24	200	1	1	4.9	0	-
			2	0	-	0	-

Appendix table 18. Abundance estimates of Pacific herring and Pacific cod by station using the bongo sampler. R/V G.B. REED, May 10-18, 1986.

Locality	Stn. no.	Net depth (m)	Mesh size	Pacific herring		Pacific cod	
				Total	Nos./ 1000 m³	Total	Nos./ 1000 m³
PACHENA POINT	1	107	1	3	26.0	0	-
			2	1	9.1	0	-
	2	148	1	2	9.7	0	-
			2	2	9.9	0	-
	3	200	1	0	-	2	8.7
			2	2	9.2	0	-
	4	200	1	0	-	0	-
			2	0	-	0	-
		200-500	1	0	-	0	-
			2	0	-	0	-
		500-700	1	0	-	0	-
			2	0	-	0	-
BARKLEY SOUND	5	200	1	0	-	0	-
			2	0	-	0	-
		200-500	1	0	-	0	-
			2	0	-	0	-

Appendix table 18 (cont'd)

Locality	Stn. no.	Net depth (m)	Mesh size	Pacific herring		Pacific cod	
				Total	Nos./ 1000 m³	Total	Nos./ 1000 m³
WICKANINNISH BAY	7	66	1	10	46.3	0	-
			2	5	23.2	0	-
	8	135	1	0	-	0	-
			2	0	-	0	-
CLAYOQUOT SOUND	9	150	1	0	-	0	-
			2	0	-	0	-
	10	200	1	0	-	0	-
			2	0	-	0	-
		200-500	1	0	-	0	-
			2	0	-	0	-
		500-700	1	0	-	0	-
			2	0	-	0	-

Appendix table 19. Abundance estimates (nos./1000 m³) of Pacific sand lance and rockfish by station using the bongo sampler. R/V G.B. REED, April 2-18, 1986. (1=230 µm mesh, and 2=350 µm mesh). Net depth is the maximum depth fished.

Locality	Stn. no.	Net depth (m)	Mesh size	Pacific sand lance		Rockfish	
				Total	Nos./ 1000 m³	Total	Nos./ 1000 m³
PACHENA POINT	1	105	1	0	-	1	7.3
			2	0	-	1	7.0
	2	155	1	0	-	0	-
			2	0	-	0	-
	3	148	1	2	10.7	3	16.1
			2	2	10.9	0	-
	4	217	1	0	-	2	8.3
			2	0	-	0	-
	5	200	1	0	-	0	-
			2	1	4.6	0	-
		200-500	1	0	-	0	-
			2	0	-	0	-
	6	200	1	0	-	0	-
			2	0	-	0	-
		200-500	1	0	-	3	7.3
			2	0	-	13	32.3
		500-700	1	0	-	6	12.2
			2	0	-	9	19.0

Appendix table 19 (cont'd)

Locality	Stn. no.	Net depth (m)	Mesh size	Pacific sand lance		Rockfish	
				Total	Nos./ 1000 m³	Total	Nos./ 1000 m³
BARKLEY SOUND	9	150	1	1	5.7	0	-
			2	3	17.5	0	-
	11	100	1	3	28.2	2	18.8
			2	0	-	0	-
	12	200	1	0	-	5	17.2
			2	4	14.1	3	10.6
	14	200	1	1	3.1	0	-
			2	0	-	2	6.4
		200-500	1	0	-	0	-
			2	0	-	0	-
	15	200	1	0	-	2	10.2
			2	0	-	4	21.2
		200-500	1	0	-	0	-
			2	0	-	0	-
		500-700	1	0	-	0	-
			2	0	-	0	-

Appendix table 19 (cont'd)

Locality	Stn. no.	Net depth (m)	Mesh size	Pacific sand lance		Rockfish	
				Total	Nos./ 1000 m³	Total	Nos./ 1000 m³
NOOTKA SOUND	21	160	1	2	11.0	11	60.7
			2	1	5.7	6	33.9
	22	200	1	0	-	1	4.8
			2	5	25.3	5	25.3
		200-500	1	0	-	0	-
			2	0	-	0	-
		500-700	1	0	-	1	2.2
			2	0	-	0	-
KYUQUOT SOUND	23	150	1	0	-	0	-
			2	3	14.7	0	-
	24	200	1	0	-	2	9.8
			2	0	-	1	3.7

Appendix table 20. Abundance estimates of Pacific sandlance and rockfish by station using the bongo sampler. R/V G.B. REED, May 10-18, 1986. (1=230 µm mesh and 2=350 µm mesh.) Net depth is the maximum depth fished.

Locality	Stn. no.	Net depth (m)	Mesh size	Pacific sand lance		Rockfish	
				Total	Nos./ 1000 m³	Total	Nos./ 1000 m³
PACHENA POINT	1	107	1	5	69.5	0	-
			2	1	9.1	0	-
	2	148	1	0	-	9	43.9
			2	0	-	2	9.9
	3	200	1	1	4.4	10	43.6
			2	0	-	4	18.4
	4	200	1	0	-	0	-
			2	0	-	0	-
		200-500	1	0	-	0	-
			2	0	-	2	4.5
		500-700	1	0	-	0	-
			2	0	-	0	-
BARKLEY SOUND	5	200	1	0	-	0	-
			2	0	-	1	4.0
		200-500	1	0	-	0	-
			2	0	-	0	-

Appendix table 20 (cont'd)

Locality	Stn. no.	Net depth (m)	Mesh size	Pacific herring		Pacific cod	
				Total	Nos./ 1000 m³	Total	Nos./ 1000 m³
WICKANINNISH BAY	7	66	1	1	4.6	1	4.6
			2	0	-	4	18.8
	8	135	1	0	-	0	-
			2	0	-	4	19.1
CLAYOQUOT SOUND	9	150	1	0	-	0	-
			2	1	5.1	1	5.3
	10	200	1	0	-	0	-
			2	0	-	0	-
		200-500	1	0	-	0	-
			2	0	-	0	-
		500-700	1	0	-	3	5.0
			2	0	-	3	5.1